

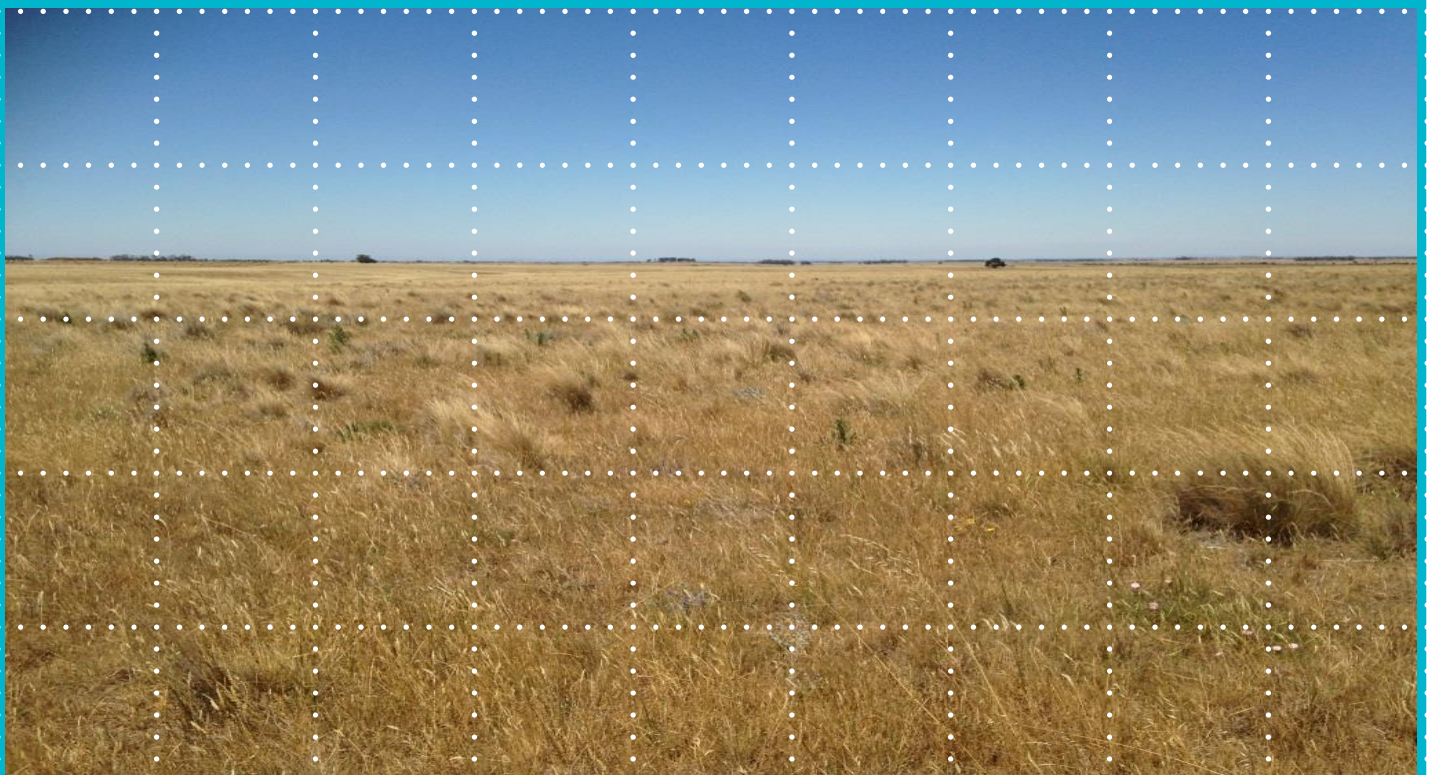
FINAL Report

Golden Sun Moth *Synemon plana* Population and Habitat Monitoring (2015/16), Saxon Paddock, Warrambeen, Victoria

Prepared for

Citipower and Powercor Australia

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Ecology and Heritage Partners Pty Ltd

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1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was engaged by Citipower and Powercor Australia to undertake Golden Sun Moth *Synemon plana* Population and Habitat Monitoring (2015/16) (Year 2) at the Saxon Paddock, Warrambeen, Victoria as part of the ongoing monitoring requirements set by the Department of the Environment (DoE) for the management of the offset site.

The offsets were associated with the construction of a power line and access roads connecting the Mt Mercer Wind Farm to the national electricity grid, north of the township of Elaine, Victoria (Ecology Partners Pty Ltd 2012). The offset requirements were set by DoE under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for the removal of 2.11 hectares of the nationally listed ecological community *Grassy Eucalypt Woodland of the Victorian Volcanic Plain* and 2.08 hectares of potential Golden Sun Moth habitat.

Population and habitat monitoring was undertaken in accordance with an approved Conservation Management Plan (CMP) to determine if Golden Sun Moth had persisted in grassland areas, to determine reproductive success and to ensure that management actions and habitats remain suitable to support a viable Golden Sun Moth population into the future (Ecology Partners Pty Ltd 2012). Annual monitoring of Golden Sun Moth populations is currently scheduled to run for an initial 5 year period, within a ten year management timeframe, to guide decisions on the success of habitat management within the offset site, and to inform the appropriate monitoring frequency for the remainder of the management timeframe.

The following report outlines the results of the 2015/16 monitoring (Year 2) and provides information on recommendations for managing Golden Sun Moth habitat within the offset site over subsequent years. This report aims to build on the previous years monitoring work to ensure improvements to the quality of native vegetation and associated Golden Sun Moth habitat are being undertaken by the land managers on site.

1.2 Scope and Objectives

The objectives of the targeted surveys were to:

- Determine the presence/absence and distribution of Golden Sun Moth throughout the offset site;
- Determine any potential impacts to Golden Sun Moth and their associated habitat in response to current management practices; and
- Provide advice on recommendations that may be undertaken to avoid and/or mitigate potential adverse impacts on significant ecological values.

1.3 Study Area

The study area (which encompasses the offset site) is located within an area known as the Saxon Paddock, Warrambeen, Victoria, which covers 42.1 hectares and is located within the Warrambeen Demonstration Landcare Farm, approximately 60 kilometres northwest of Geelong (Figure 1). The offset site, within the Saxon Paddock, consists of 8.44 hectares of suitable *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP) and GSM habitat (where Golden Sun Moth have been previously recorded) and is situated on the eastern side of the Saxon Paddock (Figure 2). The Warrambeen Demonstration Landcare Farm is privately owned and supports extensive areas of remnant native grassland.

According to the Department of Environment, Water, Land and Planning (DEWLP) Biodiversity Interactive Map (DEWLP 2015), the study area occurs within the Victorian Volcanic Plain Bioregion. It is located within the jurisdiction of the Corangamite Catchment Management Authority (CMA) and the Golden Plains municipality (DEWLP 2015).

2 METHODS

2.1 Fauna Assessment

2.1.1 Golden Sun Moth

Targeted surveys for Golden Sun Moth were undertaken on 30 November, 4, 17 and 23 December 2015. Surveys concentrated in areas identified as supporting indigenous grassland, namely those supporting Wallaby-grass *Rytidosperma* spp., which is a known food source for Golden Sun Moth.

Areas of suitable habitat were walked or driven by qualified zoologists over a minimum of four separate days during the known flight season (i.e. late-October to early January). Surveys were undertaken at a time which is considered suitable for detecting the species (i.e. when adult males are likely to be flying). The male of this species generally flies between 11am and 3pm on calm, warm (over 20°C), sunny days.

2.2 Assessment Qualifications and Limitations

Targeted Golden Sun Moth surveys were undertaken by experienced personnel during the known flight period of the species and during appropriate conditions by following suitable survey guidelines. Fauna surveys were conducted under the Ecology and Heritage Partners Pty Ltd Research Permit (#10006893) issued by DELWP under the *Wildlife Act 1975*.

Given the species was confirmed on site as a result of previous targeted surveys, no additional 'reference' sites were visited to confirm the species flight activity prior to undertaking surveys. However, given the species presence on site and the experience of surveyors, the results of this assessment are considered adequate for the purposes of confirming the species presence/absence on site and providing recommendations for managing the offset site over subsequent years.

3 RESULTS

3.1 Golden Sun Moth Monitoring

3.1.1 Previous Population Monitoring

Table 1. Golden Sun Moth Population Monitoring within the Saxon Paddock offset site during previous monitoring periods.

Survey Year	Golden Sun Moth Abundances	Management Recommendations
2011/12	9	Based on the previous survey results during the 2011/12 targeted surveys and the results of the 2014/15 monitoring, Golden Sun Moth populations have not been reduced within the Saxon Paddock offset site. Active biomass control will provide more areas of open ground and higher native vegetation cover for the species in subsequent years.
2014/15	53	
2015/16	15	While the number of Golden Sun Moth was lower this is likely due to the timing of the surveys as opposed to the quality of habitat on site given conditions have not decreased in quality over the past year.

3.1.2 Golden Sun Monitoring Results 2015/16

Targeted surveys identified a total of 18 Golden Sun Moth flying within the offset site between 30 November and 23 December 2015 (Table 2; Figure 2). The species was located predominantly within areas of more open ground containing preferred host plants including Wallaby-grasses (Figure 2). While the species was not detected in the same abundances, the species was detected over more consecutive surveys as opposed to the previous monitoring event in the 2014/15 season.

Table 2. Golden Sun Moth survey results during the 2015/16 flight season.

Date	Survey times	Reference Site	Temperature (°C) (9am and 3pm)		Wind (km/hr)	Cloud cover (%)	No. of days since rain	No. GSM
30/11/2015	16:20 – 1700	Flying during survey	15.9	28.5	24	60	2	4
4/12/2015	10:30 – 11:00	Flying during survey	16.7	30.6	7	15	1 (0.2mm)	11
17/12/2015	10:00 – 10:45	Known site	17.4	34.4	17	10	>2	3
23/01/2015	11:00 – 12:00	Known site	17.9	34.4	19	10	1 (0.2mm)	0

The species is likely to have emerged early in November or even late October before monitoring had commenced. For example, the species was observed flying in high numbers (>2000) throughout Geelong in late October indicating an early commencement of the typical flight season around this locale compared with recent years (A, Taylor pers. obs.). Given areas further west of Geelong such as Warrambeen typically have an earlier commencement of Golden Sun Moth emergence, it is likely that the peak emergence within the offset site had potentially passed prior to the commencement of monitoring. Therefore, the results from the Year 2 monitoring should not be viewed as a decrease in the overall population size or quality of habitat as conditions have improved at the site over the past year (Section 4).

3.2 Habitat Assessment

Northern Section of Offset Site

The northern third of the study area comprised a high cover of Wild Oat *Avena fatua* and will require active management to ensure the percentage cover of biomass meets the objectives of the CMP (Plates 1 – 4) (Section 4; Figure 2). However, the management of this area had improved through active biomass control (i.e. sheep grazing), in which the percentage cover had reduced since the last habitat assessment (Table 4). Embedded rock was more prominent in the northern half of the study area and covered approximately 5–10% of the total offset site (Plate 1); however, there were scattered boulders located throughout the entire offset site (albeit at <5% cover).

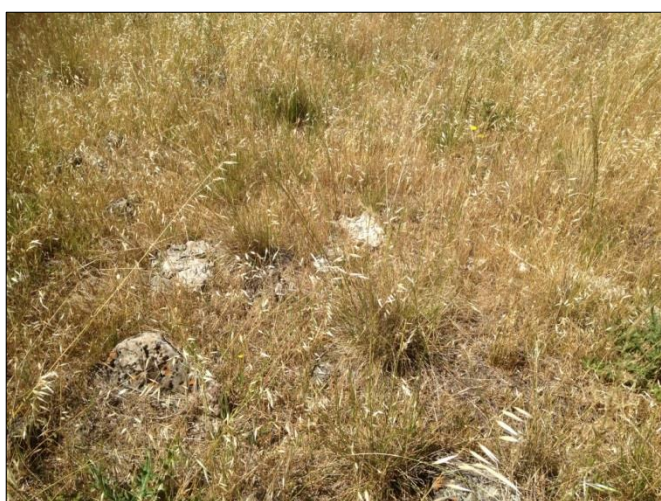


Plate 1. Rock cover in the northern section of the offset site.



Plate 2. Wild Oat *Avena fatua* cover within northern areas of the offset site.



Plate 3. Wild Oat cover within northern areas of the offset site.



Plate 4. Wild Oat cover within northern areas of the offset site.

Remaining Areas of Offset Site

The remaining areas of the offset site provided excellent habitat for Golden Sun Moth as it contained a high cover (>50%) of favourable host plants including Wallaby-grasses *Rytidosperma spp.* mixed with native Tussock-grasses *Poa spp.* and herbs such as Blue-devil *Eryngium ovinum* and Pink Bindweed *Convolvulus arvensis* (Plates 5–8).

The cover of weeds was below target values (<25%) for this portion of the offset site and the level of open ground was still similar to the 2014/15 monitoring period, remaining at approximately 15% cover throughout remaining areas of the offset site (Table 4) (Plates 6 and 8).



Plate 5. Rock cover in the northern section of the offset site.



Plate 6. Remnant grassland with open areas within the Saxon Paddock.



Plate 7. Rock cover in the northern section of the offset site.



Plate 8. Remnant grassland with open areas within the Saxon Paddock.

4 MANAGEMENT TARGETS AND RECOMMENDATIONS

The following section discusses the performance measures outlined within the Golden Sun Moth CMP (Ecology Partners Pty Ltd 2012), and the recorded cover of biomass, bare ground, pest plant and Golden Sun Moth population densities during the 2015/16 monitoring of the Saxon Paddock offset site.

The following tables aim to match the targets of the Golden Sun Moth CMP with the current levels measured on site during the spring and summer of 2015/16:

4.1.1 Biomass Control

Table 3. Biomass targets and current levels within the Saxon Paddock offset site during the 2015/16 monitoring period.

Offset Site Location (see Figure 2)	Year 1	Current Cover % - Year 2	% Biomass Control Target*	Management Recommendations
Northern Third	95%	90%	70%	Biomass Control is required using crash grazing during late January to reduce the overall biomass cover to 70% across entire offset site. The northern third of the site should be prioritised given the high cover of introduced vegetation (Figure 2).
Remaining Areas	85%	80%	70%	

Note: (*) = Control Targets set out in the Golden Sun Moth CMP (Ecology Partners Pty Ltd 2012).

4.1.2 Bare Ground

Table 4. Bare ground targets and current levels within the Saxon Paddock offset site during the 2015/16 monitoring period.

Offset Site Location (see Figure 2)	Year 1	Current Cover % - Year 2	% Minimum Bare Ground Target*	Management Recommendations
Northern Third	5%	5%	20%	Bare Ground cover was measured to be lower than the required target across the entire offset site and this is likely to be related to the presence of introduced pasture in the northern sections of the site (Figure 2). Grazing must be focused across the whole site, especially the northern third, in order to meet the 20% target outlined in the CMP.
Remaining Areas	15%	15%	20%	

Note: (*) = Control Targets set out in the Golden Sun Moth CMP (Ecology Partners Pty Ltd 2012).

4.1.3 Weed Cover

Table 5. Weed Cover and current levels within the Saxon Paddock offset site during the 2015/16 monitoring period.

Offset Site Location (see Figure 2)	Year 1	Current Cover % - Year 2	% Weed Cover*	Management Recommendations
Northern Third	75%	70%	<25%	Weed cover was measured to be higher than the required target for the northern third of the offset site and is predominantly related to the presence of introduced annual pasture grasses such as Wild Oat (Figure 2).
Remaining Areas	20%	20%	<25%	While the remaining areas throughout the offset site are meeting the weed targets, grazing and weed management should be actively undertaken to ensure the required targets outlined in the CMP are met annually.

Note: (*) = Control Targets set out in the Golden Sun Moth CMP (Ecology Partners Pty Ltd 2012).

4.1.4 Pest Plant and Animal Control

The details of any pest animal control will be provided by the landowner. Specific weed management actions (i.e. physical removal, spraying, slashing) will be undertaken by the landowner.

4.2 Management Actions Summary – 2015/2016

A summary of the required management actions and completion dates for 2015/16 of the CMP are provided below in Table 6.

Table 6. Management Action Table for the Saxon Paddock offset site for the 2015/16 monitoring period.

2015/ 16 Actions	Offset Zone	Management action	Resource/ personnel required	Timing of action	Key performance target	Completed (Yes/No)	Date
1	Entire offset site	Conduct systematic weed control for all weed species	Bushland Management Contractor/ Landowner	Refer Table 2	Maintain weed levels below 25%	Yes	Provided by Ian Taylor (landholder)
2	Entire offset site	Monitor for populations of feral animals such as rabbits and conduct control works if required.	Pest Animal Contractor/ landowner	After peak breeding season - late summer/early autumn.	No detrimental impact on values from pest animals and reduced pest numbers	Yes	Provided by Ian Taylor (landholder)
3	Entire offset site	Monitor organic litter density and control biomass outside GSM core active period (October –	Landowner	Late summer - Autumn	Maintain at least 70% vegetation cover and adhere to seasonal	Yes	See Section 3 above. Control methods to be provided by Ian Taylor (landholder)

2015/ 16 Actions	Offset Zone	Management action	Resource/ personnel required	Timing of action	Key performance target	Completed (Yes/No)	Date
		January)			spelling		
4	Entire offset site	Monitor, Golden Sun Moth populations and associated habitat (i.e. biomass levels and weed levels)	Qualified ecologist on behalf of CitiPower and Powercor Australia or Landowner	Late October to early January	Undertake population and habitat management as required (Section 3.4)	Yes	See Section 3 above – Completed by December 2015

4.3 Conclusion

While the number of Golden Sun Moth detected was lower than the previous season, this is likely to be due to an early emergence of the species during the 2015/16 monitoring period in which the peak number of moths would have been missed. Future monitoring of Golden Sun Moth must focus on timing surveys when the species is most active to ensure an accurate representation of population densities can be obtained.

Nonetheless, the offset site is continuing to provide suitable habitat for Golden Sun Moth and results of the habitat assessments indicate that there has been no decrease in the quality of habitat compared to the 2014/15 monitoring period.

Habitat monitoring of the Saxon Paddock indicated that further biomass control and weed management, predominantly in the northern third, is still required in order to meet the targets set out within the Golden Sun Moth CMP (Ecology Partners Pty Ltd 2012).

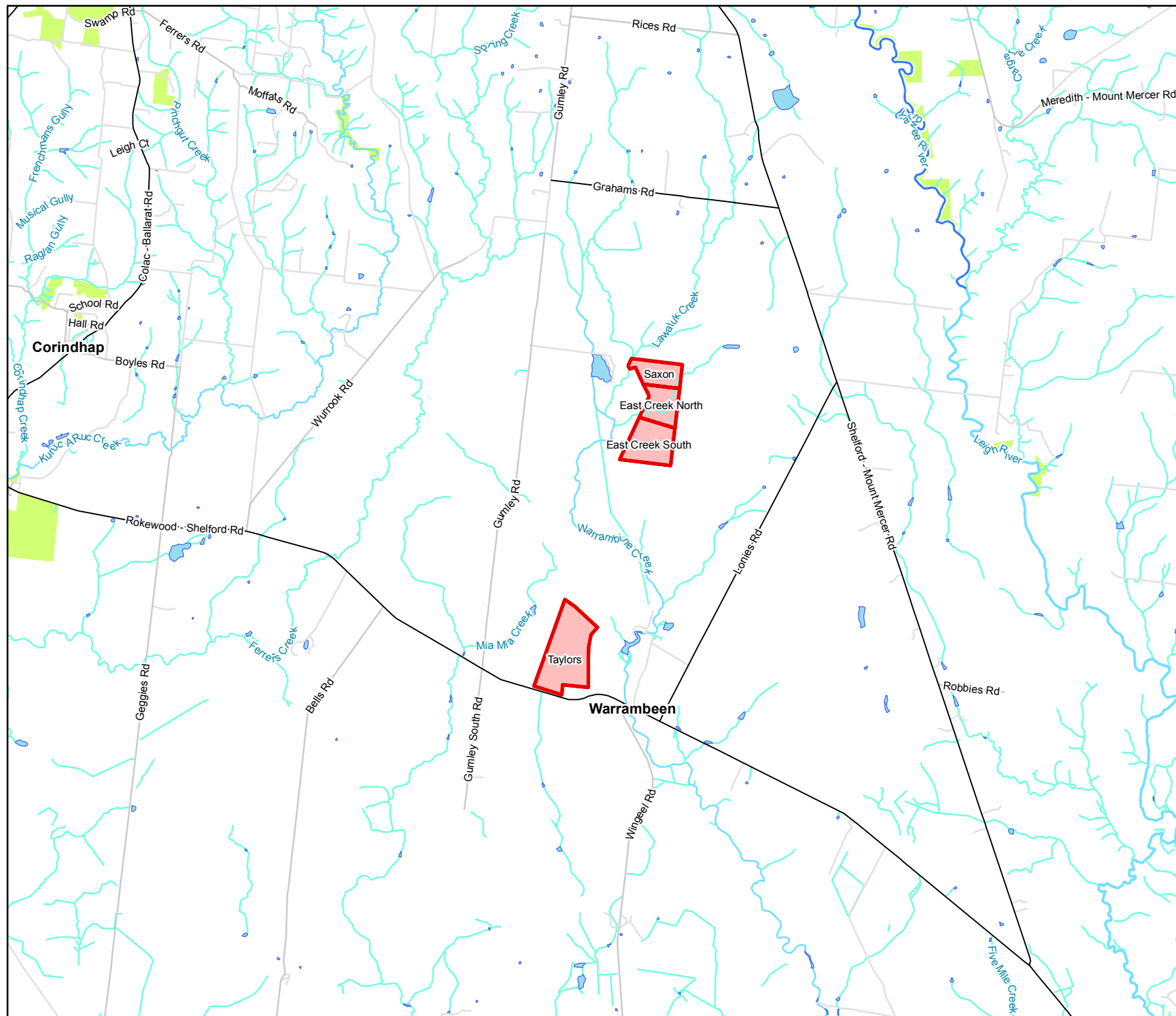
Sheep are currently used to periodically graze the paddock to control biomass. There are no signs of pugging within the offset site and a herb-rich understorey has been maintained, therefore it is appropriate for this grazing regime to continue. Options to increase grazing in the northern third of the offset site may be suitable to reduce the level of biomass and weed cover to provide more open ground and potential habitat for the species.

A Management Actions Summary for 2015/16 combining the results of this report with the active management and site monitoring undertaken by the landholder will be provided to the DoE (Ian Taylor – Warrambeen Landcare Farm) in order to meet the requirements of the CMP (Ecology Partners Pty Ltd 2012).

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FIGURES




 Study Areas



Figure 1
Location of Study Areas
Taylors Paddock, Saxon Paddock, East Creek North and East Creek South, Warrambeen

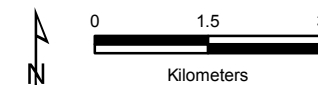
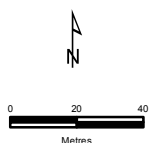




Figure 2
Golden Sun Moth
population and habitat
monitoring
Saxon Paddock,
Warrambeen

Legend

- Saxon Paddock Offset Site
- GSM records (1st survey 30/11/15) - 4 moths
- GSM records (2nd survey 04/12/15) - 11 moths
- GSM records (3rd survey 17/12/15) - 3 moths
- Proposed Biomass Control Zone
- Plains Grassland



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