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Our Ref: 1058a

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Claire Dennis
McDonnells Road
Birregurra VIC 3752
Via email: jedennis@bigpond.com

Dear Claire,

Re: Golden Sun Moth Assessments, McDonnells Road, Birregurra, Victoria

Ecolink Consulting Pty Ltd was engaged by Claire Dennis to undertake a series of Golden Sun Moth *Synemon plana* surveys at a paddock owned by the Dennis family at McDonnells Road, Birregurra (Figure 1). This paddock is approximately 110 ha in area and is being managed in accordance with an Offset Management Plan (OMP) that has been prepared for the property; an extract of which was provided to Ecolink.

These surveys are required to fulfil the obligations of an Offset Management Plan that was planned in conjunction with an application to use parts of the property as offsets for Plains Grassland and Golden Sun Moth habitat that is being developed in other parts of the state. The OMP requires both Golden Sun Moth and vegetation monitoring over a period of ten years, alternating annually.

The current surveys were undertaken to ascertain the location and population size of the moths within the paddock. These surveys were undertaken over two years because, in December 2014, the assessor suspected that the survey season was nearing an end. This suspicion was formed on the basis that relatively higher numbers of Golden Sun Moth were recorded in November by the landholders than were recorded during December, including in areas where they had previously been confirmed and numbers were declining at reference sites in and around Melbourne. As the results of the Golden Sun Moth monitoring are not due until 2016, it was decided that the surveys be postponed until early in the flight season 2015 to maximise the chance of recording the greatest number of individuals; providing a more accurate

representation of the population that is likely to be present. The results of both 2014 and 2015 surveys have been incorporated into this report.

Methods

Targeted Golden Sun Moth surveys were undertaken across the entire paddock, consistent with the methodology outlined in the Biodiversity Precinct Structure Planning Kit (DSE 2010). Surveys were undertaken on 15 and 20 of December 2014 and 30 November and 10 December 2015, between 10 am and 3pm, during fine and clear conditions (Table 1), by one or two ecologists that are familiar with the species.

The site is known to contain Golden Sun Moths, and this was confirmed during each of the surveys, and so a presence/absence confirmation using a known reference site was not necessary. Transects were walked or slowly driven (and recorded on GPS units), at approximately 10 metre grid intervals on all surveys, to ensure the detection of any individuals within the study area.

Table 1. Weather conditions for Golden Sun Moth surveys.

Date	Time at commencement	Temp (°C)	Wind Direction/Speed	Cloud	Days Since Rain
15 Dec 14	12:30-15:30	24.5	Light Southerly	10	6
20 Dec 14	11:30-15:00	26.0	Light Southerly	5	1
30 Nov 15	12:00-15:30	32.4	Moderate Gusty Northerly	10	3
10 Dec 15	10:45-14:45	25.9	Light Easterly	0	2

Results and Discussion

The study area is located in an area of undulating terrain containing several rocky knolls from historic volcanic lava flows. The basalt soils on the knolls contained embedded basalt rock, while lower lying areas contained a red fertile soil. Adjoining paddocks were similar in appearance, although the paddock to the immediate west of the study area has recently been cultivated.

Only five male Golden Sun Moths were recorded during the initial assessments in December 2014. Golden Sun Moths had been recorded earlier in the flying season by the land-holder (Table 2; Plates) who is familiar with the species. In total 20 moths were recorded by the land-holder in November 2014, including one copulating female on 19 November 2014 (Plate 1).

Table 2. Observations of Golden Sun Moth *Synemon plana* during the 2014 flying season.

Date	Latitude	Longitude	No. Males	No. Females	Total
10-Nov-14	-38.2549	143.7601	1	-	1
11-Nov-14	-38.2581	143.7703	1	-	1
11-Nov-14	-38.2592	143.7692	2	-	2
11-Nov-14	-38.2593	143.767	1	-	1
11-Nov-14	-38.2567	143.7611	1	-	1

Date	Latitude	Longitude	No. Males	No. Females	Total
11-Nov-14	-38.2566	143.7625	1	-	1
19-Nov-14 *	-38.2596	143.7695	12	1	13
20-Dec-14	-38.2596	143.7702	1	-	1
20-Dec-14	-38.2592	143.7660	1	-	1
20-Dec-14	-38.2584	143.7608	1	-	1
20-Dec-14	-38.2569	143.7619	1	-	1
20-Dec-14	-38.2609	143.7615	1	-	1

* Latitude and Longitude represents a central point for multiple observations at this location.

Only two surveys were undertaken during the 2014 assessment, with the remaining surveys completed in 2015. These surveys were undertaken earlier in the flying season than in 2014 and more moths were identified throughout the study area (Figure 1). A total of at least 221 moths were recorded across the two surveys (Table 2). All the moths were flying and all were either positively identified as male or presumed to be male. No positive identifications of females were made as the moths were flying strongly, were not observed on the ground for any length of time and were shy to approach.

Table 3. Observations of Golden Sun Moth *Synemon plana* during the 2015 flying season.

Date	Latitude	Longitude	No. Males	No. Females	Total
30-Nov-15	-38.2620	143.7695	1	-	1
30-Nov-15	-38.2605	143.7700	4	-	4
30-Nov-15	-38.2606	143.7695	12	-	12
30-Nov-15	-38.2615	143.7695	9	-	9
30-Nov-15	-38.2626	143.7691	1	-	1
30-Nov-15	-38.2616	143.7684	5	-	5
30-Nov-15	-38.2597	143.7670	11	-	11
30-Nov-15	-38.2607	143.7667	7	-	7
30-Nov-15	-38.2602	143.7638	8	-	8
30-Nov-15	-38.2589	143.7617	2	-	2
30-Nov-15	-38.2566	143.7586	1	-	1
30-Nov-15	-38.2566	143.7605	2	-	2
30-Nov-15	-38.2550	143.7600	2	-	2
30-Nov-15	-38.2586	143.7606	1	-	1
30-Nov-15	-38.2552	143.7637	1	-	1
30-Nov-15	-38.2565	143.7612	2	-	2
30-Nov-15	-38.2574	143.7608	2	-	2
30-Nov-15	-38.2581	143.7627	1	-	1
30-Nov-15	-38.2591	143.7710	1	-	1
10-Dec-15	-38.2583	143.7720	3	-	3
10-Dec-15	-38.2580	143.7708	2	-	2
10-Dec-15	-38.2565	143.7704	5	-	5
10-Dec-15	-38.2570	143.7703	4	-	4

Date	Latitude	Longitude	No. Males	No. Females	Total
10-Dec-15	-38.2579	143.7703	2	-	2
10-Dec-15	-38.2586	143.7704	4	-	4
10-Dec-15	-38.2582	143.7700	1	-	1
10-Dec-15	-38.2572	143.7698	2	-	2
10-Dec-15	-38.2565	143.7692	3	-	3
10-Dec-15	-38.2558	143.7684	2	-	2
10-Dec-15	-38.2562	143.7683	8	-	8
10-Dec-15	-38.2582	143.7678	1	-	1
10-Dec-15	-38.2589	143.7667	30	-	30
10-Dec-15	-38.2564	143.7676	2	-	2
10-Dec-15	-38.2568	143.7667	3	-	3
10-Dec-15	-38.2588	143.7661	15	-	15
10-Dec-15	-38.2559	143.7719	1	-	1
10-Dec-15	-38.2615	143.7679	2	-	2
10-Dec-15	-38.2603	143.7659	5	-	5
10-Dec-15	-38.2604	143.7665	20	-	20
10-Dec-15	-38.2604	143.7674	7	-	7
10-Dec-15	-38.2611	143.7675	15	-	15
10-Dec-15	-38.2600	143.7623	7	-	7
10-Dec-15	-38.2609	143.7638	1	-	1
10-Dec-15	-38.2598	143.7571	1	-	1
10-Dec-15	-38.2589	143.7583	1	-	1
10-Dec-15	-38.2582	143.7584	1	-	1

Moths were recorded throughout the property, particularly in association with Wallaby Grass *Austrodanthonia* sp., rather than patches of Spear Grass *Austrostipa* sp. Kangaroo Grass *Themeda triandra*. In 2015 a dry year had resulted in poor grass growth and so inter-tussock space was higher compared with 2014. Other native species that were dominant and flowering within the study area were Slender Bindweed *Convolvulus angustissimus* and Blue Devil *Eryngium ovinum*, although these aren't known food sources for moth larvae.

Fewer moths were recorded in the north-eastern section of the study area on 30 November 2015 as this area was surveyed last and the weather conditions deteriorated throughout the day. This area was surveyed first, at approximately 11am on 10 December and a greater number of moths were recorded.

The land-holder also made observations of Golden Sun Moth during the early summer of 2015. The first of these observations were made in November and extended into December (Table 4).

Table 4. Land-holder observations of Golden Sun Moth *Synemon plana* during the 2015 flying season.

Date	Latitude	Longitude	No. Males	No. Females	Total
03-Nov-2015	-38.2596	143.7597	2	-	2
08-Nov-2015	-38.2596	143.7675	6	-	6
09-Nov-2015	-38.2622	143.7632	4	-	4
18-Nov-2015	-38.2586	143.7672	1	-	1
18-Nov-2015	-38.2577	143.7676	2	-	2
18-Nov-2015	-38.2581	143.7678	2	-	2
18-Nov-2015	-38.2576	143.7678	2	-	2
18-Nov-2015	-38.2587	143.7675	1	-	1
18-Nov-2015	-38.2589	143.7693	2	-	2
18-Nov-2015	-38.2607	143.7681	6	-	6
21-Nov-2015	-38.2590	143.7696	4	-	4
24-Nov-2015	-38.2601	143.7657	2	-	2
24-Nov-2015	-38.2606	143.7660	2	-	2
29-Nov-2015	-38.2590	143.7614	2	-	2
04-Dec-2015	-38.2595	143.7688	20	-	20

As these were the first targeted Golden Sun Moth surveys of the study area it provides baseline data for future assessments that are required for years 4, 6, 8 and 10 of the 10 year management period outlined in the Offset Management Plan. If the results of the surveys are compared between 2014 and 2015 it seems that the management approach to weed control and suppression and limited grazing is having a positive impact on numbers of moths within the study area. However, given normal annual variation, the small sample size and differences in the timing of the surveys in relation to the moths flying season, this must be treated cautiously. As such no further management recommendations are made, in addition to those already prescribed under the Conservation Management Plan.

I trust the above meets with your expectations, but please call me if you have any queries, or require any amendments (Mobile phone no: 0419 894 948).

Kind regards,



Stuart Cooney
Principal Ecologist
Ecolink Consulting Pty Ltd

Targeted Golden Sun Moth Surveys, Birregurra, Victoria



References

DSE (2010). 'Biodiversity Precinct Structure Planning Kit.' (Department of Sustainability and Environment: Melbourne).

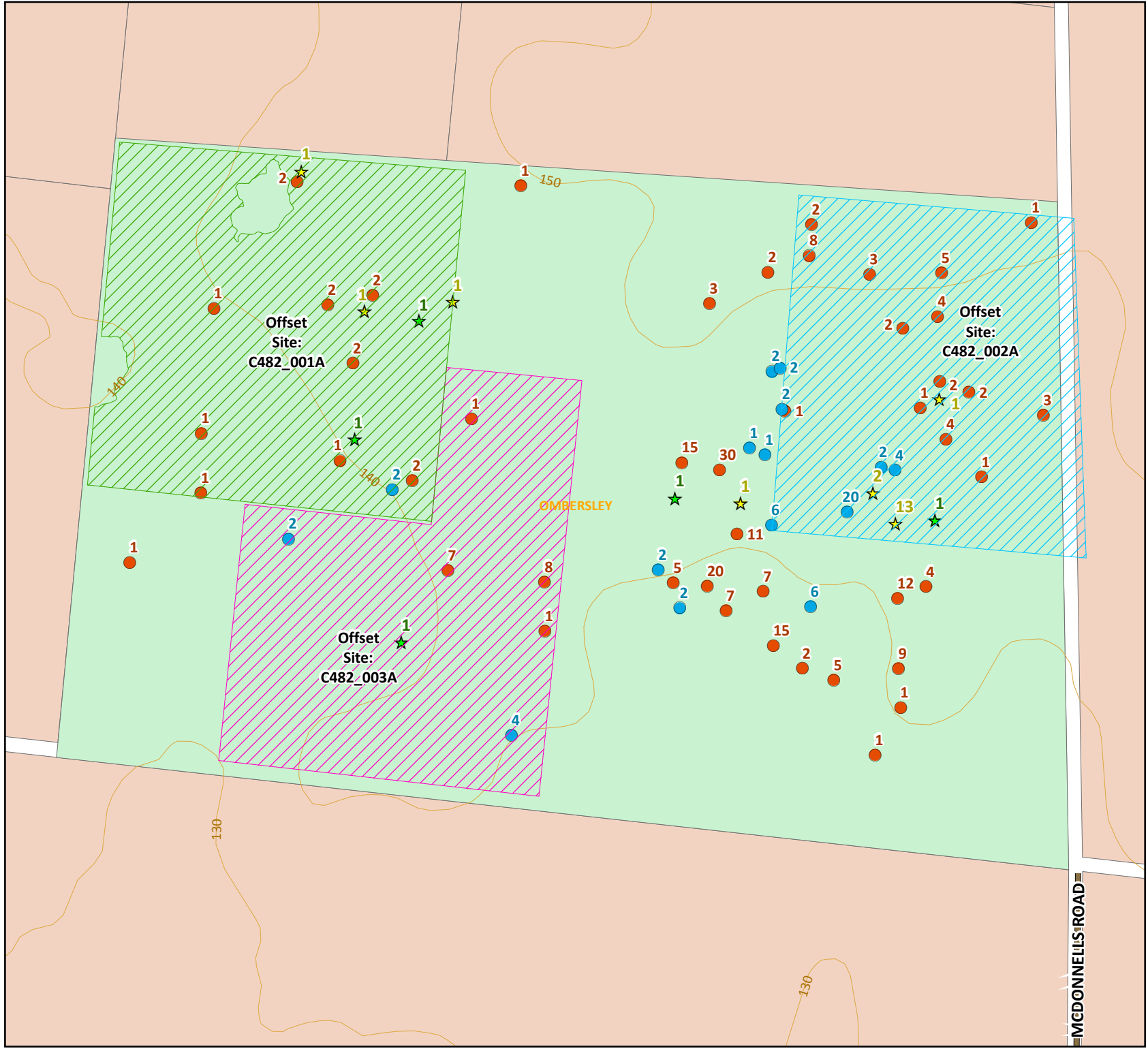
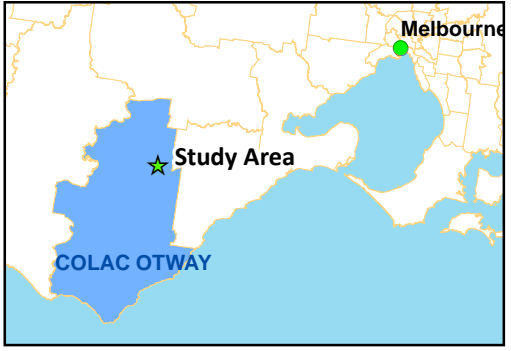
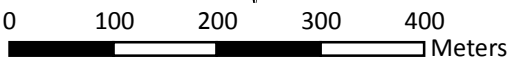
Figure 1: Results of the 2014/2015 Golden Sun Moth Assessments

McDonnells Road, Ombersley

Legend

- Study Area
- ★ Ecolink Golden Sun Moth Observations 2014
- ★ Land-holder Golden Sun Moth Observations 2014
- Ecolink Golden Sun Moth Observation 2015
- Land-holder Golden Sun Moth Observations 2015

Numbers on map represent approximate numbers of Golden Sun Moth at each location



Plates



Golden Sun Moths recorded during the 2014 flying season at the study area