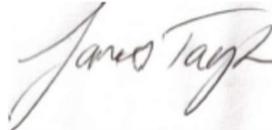


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| | |
|-------------------------------------|----------------------------------------------------------------------------------------------------------|
| Landowner of offset site | Ian, Trish and James Taylor |
| Location and address of offset site | “Woolly and Creek Paddocks” Lot 1 TP16458 Warrambeen Pty Ltd, Rokewood – Shelford Rd, Shelford. |
| Offset Proponent | Rosenthal |
| Responsible Authority | Golden Plains Shire, DSE and DEWHA |
| Report number / Year Start Year | Year 4 / 2018 2015 |
| Type of Offset Size of Offset | Vegetation and Golden Sun Moth 86 Ha |
| Signature |  |
| Date | 24 th May 2018 |

Information to be included:

- A copy of the Management Action Table from the OMP with information on which actions have been completed for the year/s of this reporting period;
- A description of the specific monitoring results from surveys undertaken for vegetation/flora species;
- A description of the specific monitoring results from surveys undertaken for significant fauna species, such as the Golden Sun Moth
- Fencing work;
- Success of weed and pest animal control work;
- Successful management tools (i.e. techniques used to control weed species, protection of new plants, monitoring technique, etc.);
- Any problems or issues experienced (i.e. new infestation of weed species, storm damage to fencing, etc.)
- Include any corrective actions and contingency measures where monitoring indicates that there has been a degradation in the native vegetation and Golden Sun Moth population and habitat; and,



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Monitoring results for significant fauna species, such as the Golden Sun Moth

(Excerpt from Ecology & Heritage Partners Final Report March 2019 FINAL)

“Targeted surveys identified a total of 39 Golden Sun Moth flying within the offset site between 4 and 6 December 2018 (Table 2; Figure 2). The species was located predominantly within areas of more open ground containing preferred host plants including Wallaby-grasses (Figure 2). The species was detected in lower abundances than during previous monitoring seasons, however GSM population size can vary greatly between years and this year’s results do not necessarily indicate a decrease in population health. The larval stage of GSM lasts for 2-3 years (DEWHA 2009). The low numbers of GSM recorded correspond with low numbers being recorded three years prior. It is likely that numbers of GSM will fluctuate based on a 2-3 year cycle, with low numbers being recorded in the 2018/19 flight season corresponding with a poor emergence/breeding season in preceding life cycles (2015/16). These cycles of low abundance are likely to correspond with poor seasonal conditions rather than a reflection of poor management. As such, flight numbers over several years should be used to review improvements in population size..”

Note: Only two GSM surveys were conducted over this time (see Table 2)



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

| Survey Year | Golden Sun Moth Abundances | Management Recommendations |
|-------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2015/16 (Baseline Data – Year 1) | 62 moths over three days (30 November, 4 and 17 December 2015) | The offset site was considered to provide favourable habitat for Golden Sun Moth at the time of the targeted surveys (Ecology and Heritage Partners Pty Ltd 2016). |
| 2016/17 (Year 2) | 238 | The results of Golden Sun Moth surveys indicate that a high overall population density of the species remains within the Rosenthal offset site. Additional biomass control and weed management is recommended to increase the overall habitat quality of remnant vegetation and Golden Sun Moth in subsequent years of the OMP implementation. |
| 2017/18 (Year 3) | 320 | The results of Golden Sun Moth surveys indicate that a high overall population density of the species remains within the Rosenthal offset site. Additional biomass control and weed management is recommended to increase the overall habitat quality of remnant vegetation and Golden Sun Moth in subsequent years of the OMP implementation. |
| 2018/19 (Year 4) | 39 | Low numbers of Golden Sun moth may be a result of natural variation in cohort size and this years survey results should not be viewed as a discrete survey, rather Golden Sun Moth abundance should be viewed across multiple years to obtain a view of population health. Weed coverage was observed to be high this year and additional biomass control and weed management is recommended to increase the overall habitat quality of remnant vegetation and Golden Sun Moth in subsequent years of the OMP implementation. |

Table 2. Golden Sun Moth survey results during the 2018/19 flight season.

| Date | Survey times | Reference Site | Temperature (°C) (9am and 3pm) | | Wind (km/hr) | Cloud cover (%) | No. of days since rain | No. GSM |
|-----------|---------------|----------------------|-----------------------------------|------|-----------------|--------------------|---------------------------|------------|
| 4/12/2018 | 12:00 – 13:30 | Flying during survey | 21.0 | 26.0 | 19 | 0 | >2 | 15 |
| 6/12/2018 | 10:00 – 14:30 | Flying during survey | 21.8 | 22.9 | 41 | 0 | >2 | 24 |



Monitoring results for vegetation/flora species

(Excerpt from Ecology & Heritage Partners Final Report March 2019 FINAL)

“The study area largely supported Plains Grassland vegetation (Plate 1), present in four quality conditions, habitat zone PG1-PG4 (Figure 2). Wallaby-grass *Rytidosperma* sp. and Spear-grass *Austrostipa* sp. were common native species present across all habitat zones. Additional native species present included Kangaroo-grass *Themeda triandra*, Common Wheat-grass *Anthosachne scabra*, Bluebell *Wahlenbergia* sp., Bindweed *Convolvulus* sp. and Bidgee-widgee *Acaena novae-zelandiae* (Plate 2).

Weeds were common across the study area, with a high cover of exotic grasses. Wild Oat *Avena fatua* was the dominant weed present across all habitat zones (Plate 3), however in PG4, cover was moderate to low. The presence of Wild Oat increased the biomass across the site, and negatively impacted on the condition of the native vegetation. Other exotic grasses present included Toowoomba Canary-grass *Phalaris aquatica*, Large Quaking-grass *Briza maxima*, Soft Brome *Bromus hordeaceus* subsp. *hordeaceus* and the Weed of National Significance, Serrated Tussock *Nassella trichotoma*.

The presence of woody or herbaceous weeds was low across the study area, with only a few Sweet Briar *Rosa rubigosa* recorded (Plate 4), and small areas of regenerating Saffron Thistle *Carthamus lanatus*. Spear Thistle *Cirsium vulgare* within the study area had previously been sprayed, with no alive adults recorded as a result of the control efforts. ”

Recent management efforts have led to the successful reduction of mature Saffron Thistle and Spear Thistle (Plate 5). Regeneration of each species is occurring, however, ongoing control will ensure the species does not re-establish within the study area (Plate 6). The low number of Sweet Briar individuals across the study area should be removed, with entire eradication possible.

The biomass cover of annual weeds has decreased since the previous assessments, however, levels are still above the biomass control target as Wild Oat is present in moderate to high cover. Ongoing management actions should be continued to reduce biomass levels, through crash grazing at appropriate times of the year as to not impact native grass seed development and spread.

The grazing regime within the OMP recommends removing stock from about the time the Wallaby Grasses *Rytidosperma* spp. start to elongate their seed heads, which is approximately in late September. Mavromihalis et al (2013) states that intensive spring grazing followed by summer exclusion has been suggested as a management strategy for reducing the abundance of exotic annual grasses and increasing native perennials in native pastures. Given that the abundance of annual weeds within the offset site are consistently higher than the target and have not been declining based on the current management regime, it is recommended that the sites grazing period is extended for approximately two months (to the end of November), and at a higher stocking density than is applied through the current management regime. It is recommended that this method is applied for two consecutive years in order to reduce the coverage of wild oat. A long term increase in stocking density and grazing period is likely to result in a reduction of native species richness therefore the third year should return to the original grazing period and stocking density as recommended in the OMP to relieve pressure on native grasses. Intensified grazing may be required in the future to maintain a low coverage of wild oat.

Where annual weed cover is particularly high in a given year (due to seasonal fluctuation), further grazing through December may be appropriate. However, given the increased risk to native herb diversity of such an extension, a qualified ecologist must review the risks and benefits of the proposed prolonged grazing period on-site prior to any implementation of an extended grazing period in any given year. The above alteration to the grazing strategy outlined within the OMP must be approved by the Commonwealth Department of Environment and Energy (DoEE) prior to implementation. It is recommended that approval is sought for alteration of the grazing period for the next two years (as outlined above) in the one application to DoEE.”

Warrambeen is currently in the process of applying to the DoEE for these changes to be implemented to the OMP.

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Fencing work

Fencing undergoes regular checks and maintenance as per the Farm program, all are in good condition and stock proof.



Success of weed and pest animal control work

Biomass Control:

The current OMP grazing regime, which prohibits grazing between September and February is not effective in producing optimal conditions for the GSM. An application to the DoEE with an updated OMP will be submitted at the earliest opportunity.

| | |
|----------|----------------------|
| 25/06/18 | 129 ewes |
| 20/08/18 | 120 ewes + 120 lambs |
| 15/10/18 | All Stock Out |

Weed Cover / Control:

Phil Spark and four staff, were engaged to grid spray paddock

- Fluroproponate, Round Up, Amine, Galon and colour dye.
- Low numbers of serrated tussock found.
- A total of 30 hours by four workers were spent targeting, Serrated Tussock, Bramble, Broadleaf, Horehound, Melon and Thistles.
- The area impacted by Wild Oat will continue to be heavily grazed to bare ground.
- Chemical Invoice attached see Appendix 3.
- Photos of Weed Control see Appendix 4.

Fox and Rabbit Control:

- Ongoing shooting programme maintained every second month with registered shooters.
- No warrens have been located so no fumigation or ripping has been conducted.
- Rabbit scats are observed infrequently.



Successful management tools

(i.e. techniques used to control weed species, protection of new plants, monitoring technique, etc.)

The combination of Grid Spraying in spring and crash grazing in the dryer months is proving to be successful in reducing Serrated Tussock and controlling Saffron and Spear Thistle. A program is in place to continue to target any re-emerging plants. No pugging is evident from grazing within the paddock, and a herb-rich understorey has been maintained.

Whilst still not reaching targets we have managed to reduce the biomass levels in this past year, the major barrier is the inability to graze in October or November.

Table 4. Biomass targets and current levels within the Rosenthal offset site during the 2018/2019 monitoring period.

| % Biomass Control Target* | Zone (see Fig. 2) | Baseline | Year 2 | Year 3 | Year 4 | Management Recommendations |
|---------------------------|-------------------|----------|--------|--------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 70% | PG1 | 70% | 80% | 80% | 75% | Biomass control targets are above the recommended levels for three out of the four habitat zones. PG4 current meets the target levels. Biomass control using crash grazing should be continually used as a management technique to reduce the biomass cover across the site. |
| | PG2 | | 75% | 90% | 85% | |
| | PG3 | | 70% | 95% | 80% | |
| | PG4 | | 70% | 80% | 70% | |

Note: (*) = Control Targets set out by Ecology and Heritage Partners (Ecology and Heritage Partners Pty Ltd 2016).



Problems or issues experienced

(i.e. new infestation of weed species, storm damage to fencing, etc.)

Due to the restriction of the OMP to only allow grazing outside the period of September to February, the prevalence of Wild Oats is becoming increasingly difficult to manage.

Corrective actions and contingency measures

(Where monitoring indicates that there has been a change in the native vegetation and Golden Sun Moth population and habitat)

As recommended by Dr Andrew Warnock, (EH&P) 2018, Warrambeen will apply to the relevant authorities to change the OMP grazing regime to help reduce weed cover and keep biomass levels under control and on target.

Currently all sheep are to be removed at the height of spring growth (exotic grasses) at the end of August.

With approval from the DoEE sheep will be grazed for the next two years through until the end of November. With other years allowing grazing until the end of September. The provision to graze through to November / December will be requested on approval from a qualified ecologist, should the weather be adversely affecting the over growth of Biomass.

Warrambeen will undergo an intensive wick and hand spraying regime to continue to reduce the instance of the Spear Thistle and Saffron Thistle.

Management Plan 2019

1. Continue Biomass Control using crash grazing during the dry months to maintain the overall biomass cover to 70% across the entire offset site.
2. With approval from the DoEE Strategic grazing will be implemented to reduce the spread of annual weeds on site, with the site being grazed into November for the next two years, and at least until the end of September on other years. The provision to have the option of extending grazing into November and December on other years, where the weather is adversely affecting the biomass levels, will also be asked for, with the proviso of a qualified ecologist giving approval.
3. Additional active weed control concentrating on Spear and Saffron Thistle, Wild Oat and Sweet Briar.
4. A team to eradicate the remaining Sweet Briar plants will be implemented ASAP.
5. All other farm practises including fencing, pest control and grid spraying and as per the OMP will continue.

Attachments

Appendix 1 – Management Action Table

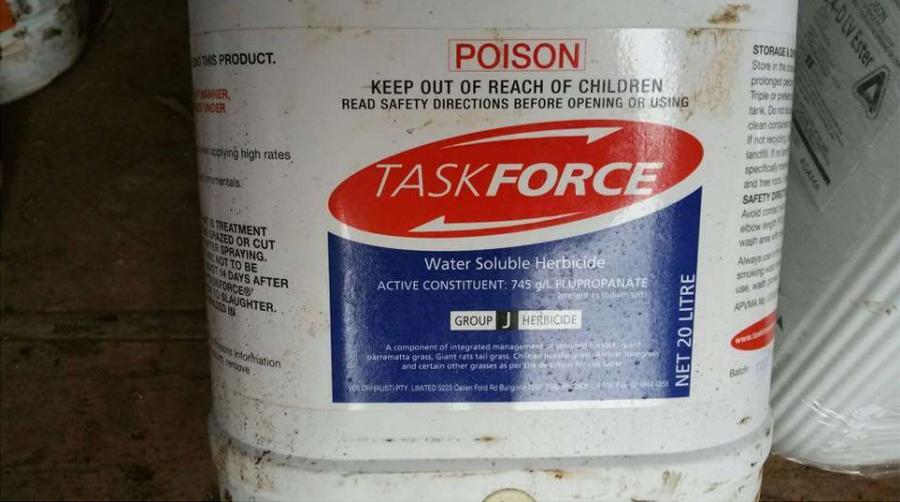
| Actions | Management action | Resource | Timing of action | Key performance target | Completed (Yes/No) | Date |
|---------|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| 4.1 | Conduct weed control | Landowner | At least three times per year, late winter, early spring and late spring | Reduce high threat weeds to <1% and medium threat weeds to <5%. Control, and if possible, reduce cover of low threat weeds. | Yes. High threat weeds are clearly being well managed | See Section 4 above. Control methods to be provided by James Taylor (landholder) |
| 4.2 | Monitor populations of pest animals and conduct control works if required | Landowner / Pest Animal Contractor | After peak breeding season - late summer/early autumn | No increase in pest animal activity from approval of this plan; and, Minimal soil disturbance and no native vegetation loss from pest animal management activities. | Yes | Provided by James Taylor (landholder) |
| 4.3 | Conduct monitoring for vegetation and Golden Sun Moth and progress reporting | Suitably qualified ecological specialist | October to early January | Golden Sun Moth has persisted in grassland areas and to ensure that management actions and habitats are suitable for a viable Golden Sun Moth population in the future. | Yes | See Section 3.1 above. |
| 4.4 | Maintain fences | Landowner/ Fencing Contractor | As required | No gaps/holes in fences | Yes | Provided by James Taylor (landholder) |
| 4.5 | Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate | Landowner/ Bushland Management Contractor/CFA | During late Summer, Autumn and Winter (if dry) | Maintain at least 70% vegetation cover and adhere to seasonal spelling. | Partial – biomass levels are above target and an alteration to the current crash grazing method is recommended. | Provided by James Taylor (landholder) |

Attachment 2 - Photos Taken October 18, 2018





Appendix 3 – Chemical Drum



Appendix 4 – Weed Control

