

2 October 2019

██████████
Environment and Sustainability Manager – Melbourne and Launceston
Australia Pacific Airports
Locked Bag 16
Tullamarine VIC 3043

Dear ██████████

Melbourne Airport Golden Sun Moth habitat survey

Our ref: Matter 28459

Biosis were engaged by Australia Pacific Airports Melbourne (APAM) to undertake a preliminary habitat assessment for the Golden Sun Moth *Synemon plana* which is listed as Critically Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Surveys were undertaken within the Melbourne Airport Estate along Moonee Ponds Creek, within Annandale Grassland and at 200 Arundel Road, Keilor. This assessment was carried out to determine whether there is currently potential habitat for the species within these areas and to provide recommendations for further survey effort.

Previous survey effort

There are known records of Golden Sun Moth within the vicinity of the Melbourne Airport Estate. The species has been recorded from Woodlands Historic Park to the north and east, and the species is widely distributed in grazing land to the north of Somerton Road in Greenvale (Victorian Biodiversity Atlas). Nearby populations occur at Oaklands Junction, Yuroke, Mickleham, Westmeadows, Coolaroo, Dallas, Sunbury and Broadmeadows. Grasslands that support suitable food plants for Golden Sun Moth larvae, including Spear Grasses *Austrostipa* spp., Wallaby Grasses *Rytidosperma* spp. and introduced Chilean Needle-grass *Nassella neesiana*, are generally considered potential habitat for Golden Sun Moth.

In 2007 GAGIN undertook an assessment to identify suitable habitat for Golden Sun Moth across the southern extent of the Melbourne Airport Estate. Following the initial habitat assessment, targeted survey was undertaken over three consecutive years in 2008, 2009 and 2010, resulting in at least three repeat surveys of the study area (GAGIN 2008, 2009, 2010). Surveys were undertaken during suitable weather conditions and on days when the species was confirmed to be active and detectable at known populations nearby. No Golden Sun Moth were recorded within the study area or in the other surveyed areas nearby. Additional targeted surveys for Golden Sun Moth were conducted within suitable habitat located within the Runway Development Program footprint in 2013 and 2014 (Biosis 2015). These targeted surveys did not detect the species.

Despite previous surveys not detecting the species, there are still areas of potential suitable habitat located across the Melbourne Airport Estate, which have not yet been surveyed for the species. It was recommended that targeted surveys be undertaken in these areas to further increase the understanding of

Golden Sun Moth presence or absence across the Melbourne Airport Estate. It was also recommended that areas previously surveyed are reassessed based on current habitat suitability for the species. Biosis has previously received general advice from DoEE that contemporary data (i.e. survey results that are no more than 2-3 years old) would be required to continue justifying the absence of Golden Sun Moth in areas of suitable habitat (DoEE pers. comm 2018).

Method

The study area constitutes the entirety of land bounded by Moonee Ponds Creek and Sunbury Road within the Melbourne Airport Estate, 200 Arundel Road and the area known as Annandale Grassland located at 77-99 and 101-103 Annandale Road, Melbourne Airport (Figure 1).

Each section of the study area was traversed on foot once on 1 December 2018 by two Biosis ecologists experienced in Golden Sun Moth identification. The ecologists walked transects 50 meters apart, while actively searching for Golden Sun Moth and making notes of habitat type present within the study area. Transect survey effort can be viewed in Figure 2. Moths, if detected, were recorded on a GPS enabled hand-held tablet.

Adults of the species, especially males, can be observed during their diurnal flights. However, their flights are generally restricted to sunny days with little wind and when temperatures are above 20°C by 10 am. Hence, capacity to detect the species is limited to active searching when conditions are appropriate. The assessment was undertaken on a day of appropriate weather conditions, as set out in the survey guidelines within the *Significant impact guidelines for the critically endangered golden sun moth* (*Synemon plana*) (Commonwealth of Australia 2009).

Following the first habitat survey for the Golden Sun Moth in the study area, APAM instructed that subsequent surveys were not to occur during the 2018-2019 flight season. As such the survey undertaken in 2018 can only be considered a habitat survey and not a targeted survey of presence or absence in accordance with the survey guidelines outlined within the *Significant impact guidelines for the critically endangered golden sun moth* (*Synemon plana*) (Commonwealth of Australia 2009).

Results

Sixty-seven Golden Sun Moth were detected in the area bounded by Moonee Ponds Creek and Sunbury Road. They were not detected in the Annandale Grasslands or 200 Arundel Road property. Weather conditions and results of the survey can be viewed in Table 1.

Annandale Grasslands

Despite the presence of suitable habitat, Golden Sun Moth were not detected during the one-day habitat survey. The western paddock contained within the Annandale Grassland provides large expanses of suitable habitat for the Golden Sun Moth. There is a large patch of grassland, which qualifies as the EPBC Act listed Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP) ecological community, and other scattered patches of Plains Grassland (EVC 132). There are large expanses of Wallaby Grasses and Spear Grasses. The eastern portion of this site contains limited habitat for the species as this paddock had recently been subject to pasture improvement and contains predominantly sown Perennial Rye-grass *Lolium perenne* and herbaceous weeds. There are some occurrences of Wallaby Grasses recolonising and there is a possibility that suitable habitat for the species may return in coming years.

200 Arundel Road

Golden Sun Moth were not detected during the one-day habitat survey at 200 Arundel Road. The property has historically been utilised for cattle grazing. The site contains a flat grassy area adjacent to Arundel Creek and a steep grassy slope. The site is comprised of predominately introduced vegetation which is unlikely to be habitat for the Golden Sun Moth. Nonetheless, there are scattered patches of suitable habitat for the Golden Sun Moth within the site with areas of Plains Grassland dominated by Knead Spear-grass *Austrostipa bigeniculata* and Bristly Wallaby-grass *Rytidosperma setaceum* present.

Moonee Ponds Creek

Creekline Grassy Woodland dominated by River Red-gum *Eucalyptus camaldulensis* occurs intermittently along and immediately adjacent to Moonee Ponds Creek. The midstorey is comprised of native shrubs, mainly Hedge Wattle *Acacia paradoxa*. River Red-gum occurs along the creek within patches (mapped) or as isolated trees (not mapped) and some trees are large in size (diameter at breast height greater than or equal to 80 centimetres). The vegetation is modified from its original condition and does not meet criteria for Grassy Eucalypt Woodland of the Victorian Volcanic Plain due to limited native grasses in the understorey. Despite the overall poor condition of the understorey, there are scattered Kangaroo Grass *Themeda Triandra*, Wallaby Grasses and Spear Grasses in some areas.

Further from Moonee Ponds Creek, the native riparian vegetation dominated by River Red-gum makes way for predominantly introduced treeless vegetation, characterised by Serrated Tussock *Nassella thrichotoma*, Ribwort *Plantago lanceolata*, Turnip *Brassica* spp. and Artichoke Thistle *Cynara cardunculus* subsp. *flavescens*. Scattered Wallaby Grasses persist among the introduced species in some areas.

Sixty-seven male Golden Sun Moth were detected during the survey adjacent to Moonee Ponds Creek. The individuals were recorded in areas dominated by Ribwort and Turnip. This is not generally typical habitat for the species. The observation of Golden Sun Moth in these areas is unusual and should be considered when determining target areas for further survey in the future. Further investigation may contribute to a better understanding of this species' habitat requirements.

It is likely that the Parks Victoria managed Woodlands Historic Park on the eastern side of Moonee Ponds Creek supports a large population of the Golden Sun Moth, which may be the source of the males detected during this survey. Further targeted surveys would be required to determine whether the species is utilising the area on the western side of Moonee Ponds Creek as habitat or whether the records constitute males that have been blown astray from more usual habitat located within the Woodlands Historic Park. Photos of the atypical habitat where the moths were found can be viewed in Appendix 1.

Table 1 Results and weather conditions during Golden Sun Moth habitat survey

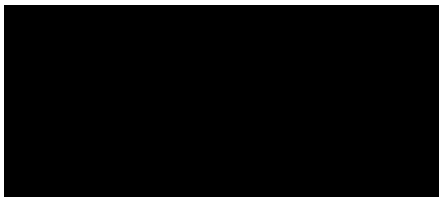
Date	Moonee Ponds Creek 1/12/2018	Annandale Grasslands 1/12/2018	200 Arundel Road 1/12/2018
Habitat description	North east aspect, scattered habitat grasses, but Serrated Tussock, Ribwort, Turnip and Artichoke Thistle dominant.	Western portion of site NTGVVP and has good cover of Wallaby Grasses and Spear Grasses. Eastern paddock has been recently pasture improved and was mostly non-habitat introduced grasses.	Predominately introduced vegetation, not habitat. Small areas of habitat occur in scattered patches of Plains Grassland dominated by Kneed Spear-grass and Bristly Wallaby-grass. Paddocks previously grazed by cattle. Large infestation of Buchan Weed.
Start time	10.30	10.25	13.00
End	14.00	12.25	15.25
Golden Sun Moth recorded	Y	N	N
Number of Golden Sun Moth observed	67 (all males)	0	0
Site temperature (°C) (start/end)	22.4 / 27.6	21 / 27.6	27.6 / 32
Cloud cover (%) (start/end)	0 / 5	0 / 0	0 / 0
Wind direction (start/end)	N / N	N / N	N / N
Average wind speed (km/hr) (start/end)	17/28	10 / 30	30 / 25
Ground conditions	Dry	Dry	Dry
Humidity (%) (start/end)	36 / 25	10 / 25	25 / 5
Reference site where moths were recorded on day of survey	Broadmeadows Valley Park (Golden Sun Moth recorded flying)		

Recommendations



Please contact me if you have any enquiries.

Yours sincerely



Consultant Zoologist



Appendix 1 Photos of atypical habitat where Golden Sun Moth were detected along Moonee Ponds Creek



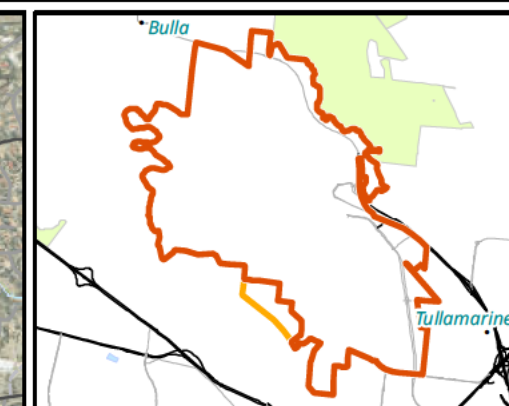
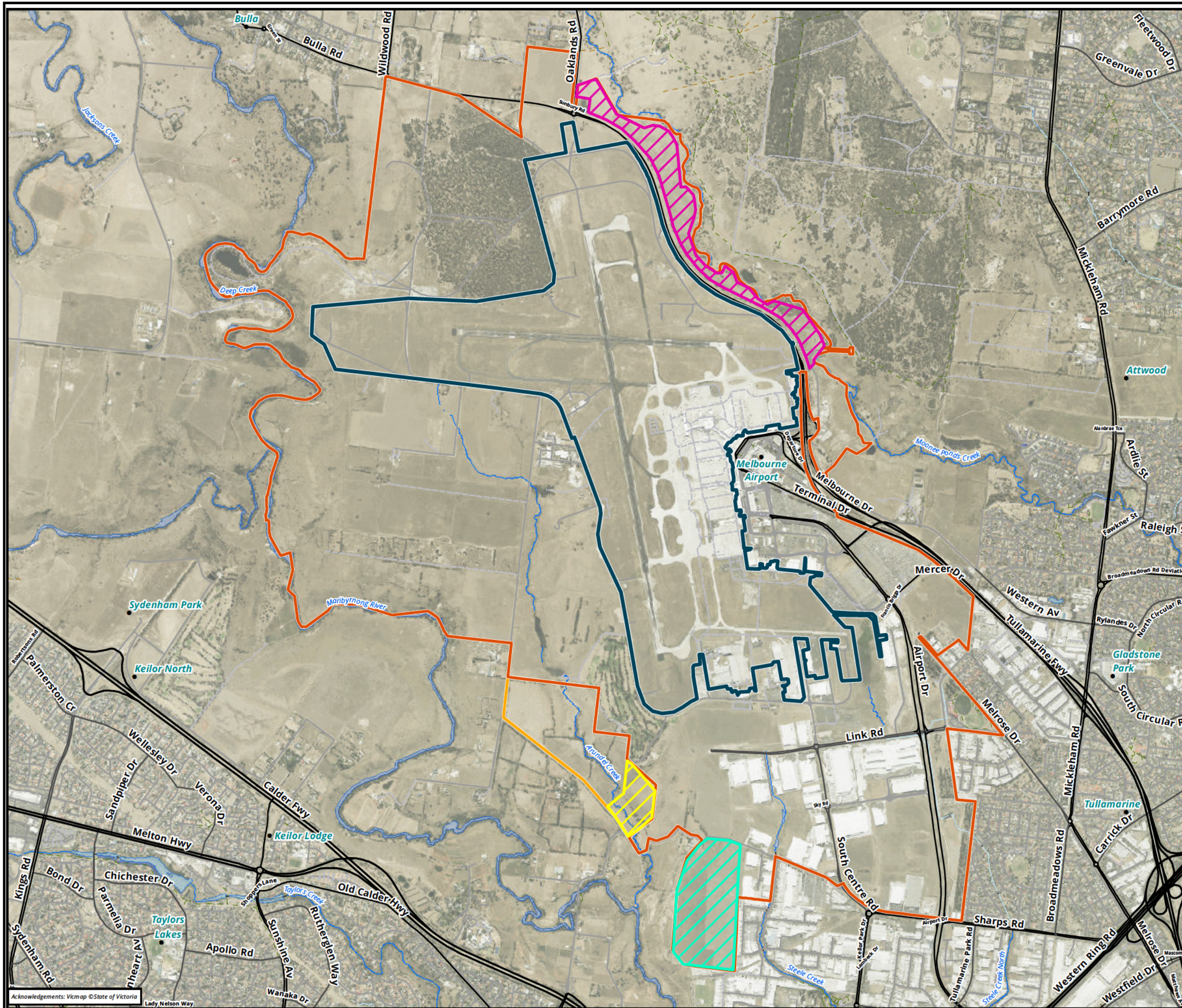
Photo 1 Area where Golden Sun Moth was detected, west of Moonee Ponds Creek.



Photo 2 Typical ground cover where Golden Sun Moth were detected comprised predominantly of Ribwort.

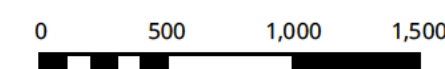


Photo 3 Golden Sun Moth resting on Ribwort, which dominated the vegetation in this area.



- Legend**
- Melbourne Airport land
 - Freehold land
 - Airside boundary
- Study areas**
- Moonee Ponds Creek
 - 200 Arundel Road
 - Annandale Grassland

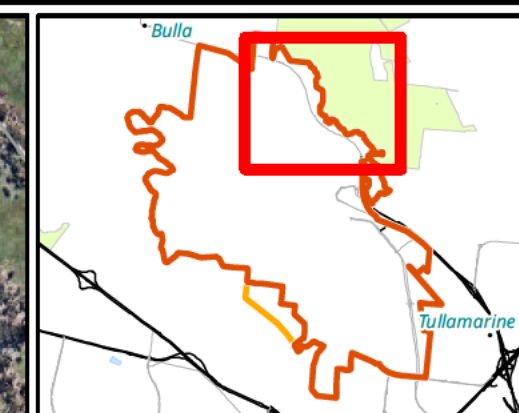
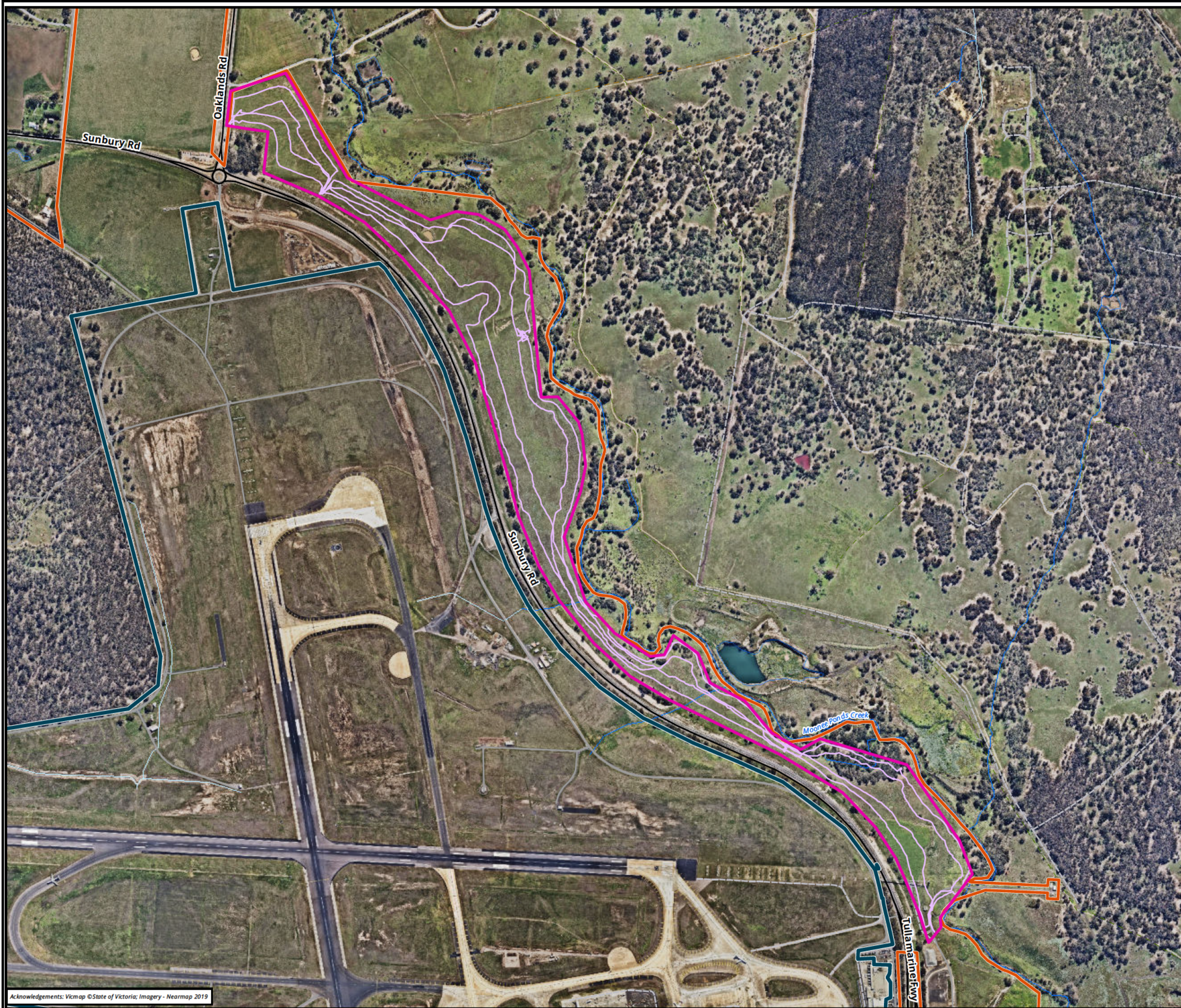
Figure 1 Location of the 2018 Golden Sun Moth habitat survey, Melbourne Airport



Meters
Scale: 1:30,000 @ A3
Coordinate System: GDA 1994 MGA Zone 55



Matter: 28459,
Date: 03 October 2019,
Location: P:\28400s\28408\Mapping\28459_GSM2018_F1_overview.mxd



- Legend**
- Melbourne Airport land
 - Airside boundary
 - Survey transects
- Study areas**
- Moonee Ponds Creek

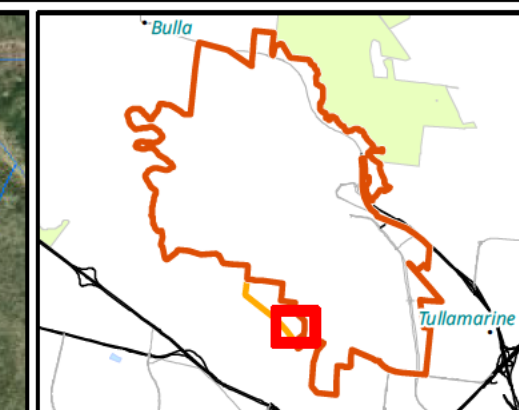
Figure 2.1 Golden Sun Moth survey effort 1/12/2018, Melbourne Airport

0 100 200 300 400 500
Meters

Scale: 1:10,000 @ A3
Coordinate System: GDA 1994 MGA Zone 55

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Location: P:\28400s\28408\Mapping\28459_GSM2018_F2_SurveyEffort.mxd



Legend

- Melbourne Airport land
- Freehold land
- Survey transects

Study areas

- 200 Arundel Road

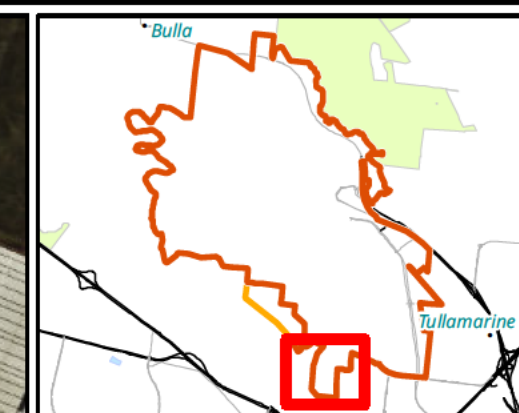
**Figure 2.2 Golden Sun Moth
survey effort 1/12/2018,
Melbourne Airport**

0 100
Meters

Scale: 1:2,500 @ A3
Coordinate System: GDA 1994 MGA Zone 55

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Legend

- Melbourne Airport land
- Freehold land
- Survey transects

Study areas

- 200 Arundel Road
- Annandale Grassland

Figure 2.3 Golden Sun Moth survey effort 1/12/2018, Melbourne Airport

0 100 200
Meters

Scale: 1:5,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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