

Australian Capital Territory

Nature Conservation (Golden Sun Moth) Conservation Advice 2020

Notifiable instrument NI2020–566

made under the

Nature Conservation Act 2014, s 90C (Conservation advice)

1 Name of instrument

This instrument is the *Nature Conservation (Golden Sun Moth) Conservation Advice 2020*.

2 Commencement

This instrument commences on the day after its notification day.

3 Conservation advice for Golden Sun Moth

Schedule 1 sets out the conservation advice for Golden Sun Moth (*Synemon plana*).

Arthur Georges
Chair, Scientific Committee
4 September 2020

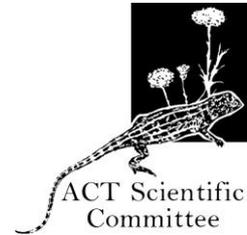
Schedule 1

(see s 3)



ACT
Government

Environment, Planning and
Sustainable Development



ACT Scientific
Committee

CONSERVATION ADVICE

GOLDEN SUN MOTH – *Synemon plana*

CONSERVATION STATUS

The Golden Sun Moth *Synemon plana* Walker, 1854, is recognised as threatened in the following jurisdictions:

National	Critically Endangered , <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
ACT	Endangered , <i>Nature Conservation Act 2014</i>
NSW	Endangered , <i>Biodiversity Conservation Act 2016</i>
VIC	Threatened , <i>The Flora and Fauna Guarantee Act 1988</i> Critically Endangered , Advisory List of Threatened Vertebrate Fauna in Victoria

ELIGIBILITY

The factors that make the Golden Sun Moth eligible for listing as Endangered in the ACT Threatened Native Species List are included in the Listing Background section below.

DESCRIPTION AND ECOLOGY

Golden Sun Moth adults are medium-sized moths within the family Castniidae. Males have dark brown upper forewings with pale grey patterning, bronzy hind wings with dark brown patches, and the undersides of both wings are pale grey with dark brown spots. Females have dark grey upper forewings with pale grey patterning, bright orange hind wings with black submarginal spots, and the undersides of both wings are silky white with small black submarginal spots.

Adult moths have clubbed antenna and no functional mouth parts, so cannot feed or drink and most live for only one or two days (Edwards 1993; Edwards 1994; Harwood et al. 1995; Rowell 2007; Rowell 2012). The sex ratio on emergence is about 60% males and 40% females. (Richter 2010; Richter et al. 2012). Females have a wingspan of about 31 mm and are only able to walk or flutter for short distances (Edwards 1994; Richter 2010). Males have slightly larger wingspan (34 mm on average) and are active fliers, able to move several hundred metres over suitable habitat (Richter et al. 2013).



Golden Sun Moth (Rob Parnell – Canberra Nature Map)

Males fly low and rapidly over the grassland during the late morning and early afternoon, searching for females. Males do not fly far from habitat, and usually turn back after 50 metres or less when they enter unsuitable vegetation. Females sit on the ground, exposing their golden hindwings when a male flies overhead (Edwards 1994; Gibson 2006). In the ACT, the flying period is usually between late spring to early summer, varying according to seasonal conditions (ACT Government 2017a).

Adult females contain, on average, 74 fully formed eggs (>2 mm long) on emerging from pupation. After mating, the females move, up to only a few metres (Gibson 2006), from tussock to tussock, laying eggs into the tussock bases. The cream-colored larvae develop and feed underground for one to three years (Edwards 1994; Richter 2013). They have been found associated with the roots of a few species of grasses or at the upper end of silk-lined tunnels below the tussock base (Richter 2010). Golden Sun Moth larvae primarily consume native temperate grasses, especially Wallaby Grasses (*Rytidosperma* spp., formerly *Austrodanthonia*) and Spear Grasses, as well as, the introduced Chilean Needle Grass (*Nassella neesiana* (Edwards 1994; Braby and Dunford 2006; Gibson 2006; Gilmore et al. 2008; Brown and Tolsma 2010; Richter et al. 2011, 2013; Sea and Downey 2014) which is a listed Weed of National Significance (WONS)).

DISTRIBUTION AND HABITAT

Historically, the Golden Sun Moth was widespread in south-eastern Australia and relatively continuous throughout its range, showing a close correlation with the distribution of temperate grasslands dominated by Wallaby Grasses (Edwards 1993; O'Dwyer and Attiwill 1999). Museum records indicate the Golden Sun Moth was still common and widespread prior to 1950 (Edwards 1993).

The Golden Sun Moth has been recorded across 100 (mainly small) sites north and west of Melbourne and in south-west Victoria (Brown and Tolsma 2010; Brown et al. 2011; DSE 2013), 48 sites in NSW (OEH 2012) and 78 sites in the ACT. Most of the populations of Golden Sun Moth in the ACT region are smaller than five hectares and lie within an area about 100 km long and 30 km wide, extending from the Queanbeyan district in the south-east to the Boorowa area in the north-west (Clarke and Whyte 2003; NSW Government 2015). In the ACT, the species occurs in lowland areas adjacent to the city of Canberra, and in mostly small sites within the city.

In the ACT, the Golden Sun Moth occurs on land under a range of tenures and land management regimes. The area of apparently suitable (or potential) habitat in the ACT is estimated at 1800 hectares (ACT Government 2017). There are large populations on Commonwealth Land at the Majura Training Area and Canberra Airport in the Majura Valley, at the Lawson Grasslands (former Belconnen Naval Transmission Station site) and at the West Macgregor offset area. Less extensive populations occur in the Dunlop Grasslands Reserve and Jarramlee Nature Reserve in Belconnen, in the Jerrabomberra Grasslands (east and west), and in the Mulanggari, Crace, Mulligans Flat and Goorooyaroo Nature Reserves in Gungahlin. Based on the known former distribution of lowland temperate grassland in the ACT and areas surveyed for the Golden Sun Moth, it is unlikely any significant populations of the species remain undiscovered.

The Golden Sun Moth often occurs on sites that contain the Critically Endangered Natural Temperate Grassland ecological community and other threatened grassland species, and sometimes within remnants of the Critically Endangered Yellow Box–Blakely's Red Gum Grassy Woodland ecological community. The vast majority (88%) of Golden Sun Moth habitat in the ACT occurs in areas with less than 5% canopy cover (Mulvaney 2012) that generally have not been heavily fertilised or ploughed (Richter et al. 2010).

Habitat for Golden Sun Moth is characterised by the moderate abundance of larval food plants and the structure of the grassy layer. Golden Sun Moths are most often found at sites with higher cover of Wallaby Grasses, provided that the tussock structure and inter-tussock bare ground is maintained (Gibbons and Reid 2013). Important structural features appear to be tussocks for shelter, egg-laying and larval development, and inter-tussock spaces for basking to increase body temperature and for females to display and attract mates (Edwards 1994; Gibson 2006; Gibbons and Reid 2013). Where vegetation height and density vary, male moths show a preference for flying over areas of relatively low open grassland with reduced herbage mass (Gibson 2006; Gilmore et al. 2008; Brown et al. 2011).

Because males are unlikely to fly more than 100 metres away from suitable habitat (Clarke and O'Dwyer 2000), and females move even less distance, populations separated by 200 metres or more are likely to be isolated and are therefore treated as separate sites. Populations of Golden Sun Moth tend to have a patchy distribution within an area of apparently suitable habitat (ACT Government 2017a).

The use of Chilean Needlegrass as a food plant by the Golden Sun Moth larvae (Braby and Dunford 2006; Gilmore et al. 2008) has allowed the moth to survive in disturbed and degraded habitats and to spread along roadsides and creek lines, potentially connecting populations which are currently isolated on native-dominated sites (ACT Government 2017a). Despite the potential opportunities of this relationship there are risks that need to be assessed with Chilean Needle Grass, as a Weed of National Significance, being introduced into Critically Endangered ecological communities and potential to drive genetic change, which could eventually lead to genetic barriers between isolated populations adapted to different conditions.

THREATS

The Golden Sun Moth is restricted to areas of Natural Temperate Grassland, a Critically Endangered ecological community under the *Nature Conservation Act 2014* (NC Act). The main threats provided in the ACT Action Plan for the species (ACT Government 2017a) include:

- habitat loss and fragmentation through urban development, leading to loss of small sites and fragmentation of larger sites
- habitat degradation through weed invasion, reducing the density and quality of larval food sources
- other conservation programs, specifically those that target Chilean Needle Grass as a Weed of National Significance, as this has become an additional food source
- grassfire or inappropriate fire regimes, especially frequent or intense burns within the pupation and flight period, as well as, changes in the fire regime in the ACT or a longer fire season
- inappropriate disturbance regime leading to either accumulation of biomass leading to formation of tall grass sward with low bare ground due to low disturbance, or formation of a very short sparse structure with high bare ground due to frequent intense disturbance
- land management regimens such as pasture improvement, ploughing, or excessive fertiliser use may reduce available grass, damage larvae, or encourage invasive weeds
- shading by plantings or by buildings that alter ideal soil temperature and moisture presumed necessary for the Golden Sun Moth life cycle.

MAJOR CONSERVATION OBJECTIVE

The overall objective of the action plan (ACT Government 2017a) is to preserve viable, wild populations of Golden Sun Moth in the ACT.

CONSERVATION PRIORITIES

The preservation of appropriately sized and connected areas of Golden Sun Moth habitat is necessary for species survival. Priorities include to:

- conserve larger populations on larger sites
- conserve optimal habitat quality, particularly through an appropriate herbage mass management regime
- establish relevant monitoring and research for adaptive management of habitat
- manage adjacent grassland to increase habitat area and connect populations or establish/re-establish populations
- identify opportunities and collaborate with research institutions and non-government organisations, especially citizen science and volunteer efforts.

OTHER RELEVANT ADVICE, PLANS OR PRESCRIPTIONS

- ACT Action Plan – Golden Sun Moth (ACT Government 2017a)
- ACT Native Grassland Conservation Strategy (ACT Government 2017b)
- Commonwealth Conservation Advice – Golden Sun Moth (Department of Environment 2013)
- National Recovery Plan – Golden Sun Moth (NSW OEH 2012)

LISTING BACKGROUND

The Golden Sun Moth was listed in the ACT as an Endangered species on 1 February 1996 in accordance with section 21 of the *Nature Conservation Act 1980*. At that time, the Flora and Fauna Committee (now the Scientific Committee) concluded that the assessment satisfied the following criteria:

- 1.2 Species is observed, estimated, inferred or suspected to be at risk of premature extinction in the ACT region in the near future, as demonstrated by:
 - 1.2.1 Current severe decline in population or distribution from evidence based on:
 - 1.2.1.1 Direct observation, including comparison of current and historical records.
 - 1.2.1.3 Severe decline in quality or quantity of habitat.
 - 1.2.5 Continuing decline or severe fragmentation in population, for species with a small current population.

The Flora and Fauna Committee assessed that this species met the above criteria for listing as Endangered for the following reasons:

- There was a serious decline in the quality and quantity of habitat for this species throughout its range, including the ACT, and known populations are now fragmented in distribution.
- The grassland habitat of this species has been and continues to be exploited for agricultural, urban and industrial development. The remaining areas are vulnerable to further fragmentation associated with urban infrastructure and there is no practical way of connecting the remaining disjunct areas.

In 2002, the Golden Sun Moth was eligible for listing as Critically Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as assessed against Criterion 2 – small geographic distribution. The main reasons that the species was eligible for listing in this category, at that time, were that the remaining distribution was highly fragmented in small, isolated fragments constituting an estimated area occupancy of 8.8 km² across 65 sites with the habitat facing ongoing threats (Threatened Species Scientific Committee (TSSC) 2002). However, areas of potential habitat had

not been comprehensively mapped or surveyed and more recent targeted surveys for the species around Melbourne and in regional Victoria (Brown and Tolsma 2010; Brown et al. 2011) substantially increased the number of known localities. The Golden Sun Moth is now on the Commonwealth's Finalised Priority Assessment List (FPAL) for 2019 for reassessment of its eligibility to be listed as threatened under the EPBC Act which is due to be completed in 2022 (TSSC 2019).

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FURTHER INFORMATION

Further information on the related Action Plan or other threatened species and ecological communities can be obtained from: Environment, Planning and Sustainable Development Directorate (EPSDD).
Phone: (02) 132281, EPSDD Website: <http://www.environment.act.gov.au/cpr>