135 O'HERNS ROAD, EPPING

THREATEND SPECIES ASSESSMENT

O'Herns Road Developments Pty Ltd



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1. EXECUTIVE SUMMARY

Brett Lane and Associates Pty Ltd was engaged by O'Herns Road Developments Pty Ltd to undertake targeted surveys of 135 O'Herns Rd, Epping in Melbourne's outer north. One flora species and two fauna species of conservation significance were identified as having the potential to occur at the study area in a previous survey by Brett Lane and Associates Pty Ltd (2008)—Report 7145 (2.2). The species having the potential to occur at the study area were the nationally threatened Purple Diuris (*Diuris punctata var. punctata*), Striped Legless Lizard (*Delmar impar*) and Golden Sun Moth (*Synemon plana*).

Targeted surveys for these species were undertaken between September and December 2007. The targeted surveys focused on an area identified as Habitat Zone C and mapped as supporting Stony Knoll Shrubland (EVC 649). The surveys occurred within suitable habitat, as identified in the abovementioned report and involved the use of industry standard survey methods developed for each species.

No threatened flora or fauna species were recorded during this current threatened species targeted assessment. Therefore, no further implications—other than those previously documented (Brett Lane & Associates Pty Ltd 2008)—are identified under relevant legislation and policies such as the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, Victorian *Flora and Fauna Guarantee Act 1988* and the Victorian Native Vegetation Management Framework. For this reason, a referral to the Federal Minister under the *Environment Protection and Biodiversity Conservation Act 1999* would not be required in this instance.



2. INTRODUCTION

Brett Lane and Associates Pty Ltd was engaged to undertake targeted surveys of 135 O'Herns Rd, Epping in Melbourne's outer north. One flora species and two fauna species of conservation significance were identified as having the potential to occur at the study area in a previous survey by Brett Lane and Associates Pty Ltd (2008)—Report 7145 (2.2). These species included the nationally threatened Purple Diuris (*Diuris punctata* var. *punctata*), Striped Legless Lizard (*Delmar impar*) and Golden Sun Moth (*Synemon plana*). The targeted surveys focused on an area identified as Habitat Zone C and mapped as supporting Stony Knoll Shrubland (EVC 649).

This current assessment has been undertaken to ascertain the presence, or otherwise, of the three threatened species in the study area, and to identify the potential impacts that the proposed industrial subdivision may pose to these threatened flora and fauna species. Of particular interest are the implications of biodiversity protection regulations, such as the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999, Victorian *Flora and Fauna Guarantee Act* 1988 and potential changes to conservation significance of the patch of remnant native vegetation under the Victorian Native Vegetation Management Framework (through Clause 52.17 of the Particular Provisions of the planning scheme).

This report presents the findings of the assessment, identifies issues and provides recommendations and mitigation options. It is divided into the sections described below:

Section 3 presents the methodology and results of the Purple Diuris targeted survey;

Section 4 presents the methodology and the results of the Striped Legless Lizard targeted survey;

Section 5 presents the methodology and results of the Golden Sun Moth targeted survey;

Section 6 provides a discussion on the implications of the findings under relevant Commonwealth and State legislation and policies and provides recommendations.

This investigation was undertaken by a team comprising Curtis Doughty (Zoologist), Peter Lansley (Zoologist), Khalid Al-Dabbagh (Zoologist), Teisha Sloan (Zoologist), Alan Brennan (Senior Ecologist) and Brett Lane (Principal Consultant).



3. PURPLE DIURIS

This section addresses the background and findings of the targeted survey for the threatened orchid Purple Diuris (*Diuris punctata* var. *punctata*).

3.1. Background and existing information

A flora and fauna assessment undertaken in early September 2007 (Brett Lane & Associates Pty Ltd 2008) determined that the study area contained suitable habitat for the orchid Purple Diuris in the form of a patch of the Ecological Vegetation Class, Stony Knoll Shrubland (EVC 649).

Purple Diuris is a flora species listed as threatened under the Victorian *Flora and Fauna Guarantee Act 1988* and *vulnerable* on the Department of Sustainability and Environment's Advisory List of Rare and Threatened Plants in Victoria (DSE 2005). The orchid, which flowers in October and November, has been recorded on the Viridans Flora Information System (FIS) – a database administered by the DSE – within a 10-kilometre search region centred on the study area. To determine the presence or otherwise of this species in the study area, a targeted survey during the plant's flowering period was recommended for one small patch comprising Stony Knoll Shrubland being Habitat Zone C (Figure 1).

3.2. Site description

The broader study area comprises grazing land dominated by exotic pasture grasses and weeds. However, a small patch of Stony Knoll Shrubland (Habitat Zone C) was recorded and it is described below.

The majority of **Habitat Zone C** included exposed basalt rock, and a dense cover of bryophytes and lichen existed at lower elevations. No tree canopy was present and the native understorey component of this vegetation was composed of the native species Hedge Wattle (*Acacia paradoxa*), Small Vanilla-Iily (*Arthropodium minus*), Common Rice-flower (*Pimelea humilis*), Curved Rice-flower (*Pimelea curviflora*) and several native grasses and forbs. The most abundant exotic plants included Cape Weed (*Arctotheca calendula*), Sweet Briar (*Rosa rubiginosa*) and Paterson's Curse (*Echium plantagineum*).

3.3. Survey methodology

The targeted survey for Purple Diuris was undertaken on 19th November 2007 during warm and sunny conditions. Transects in a north-south orientation five metres apart were walked by a qualified botanist throughout Habitat Zone C (Figure 1). The perimeter of the habitat zone was identified using GPS track data collected during the previous assessment and uploaded to a handheld GPS unit. Transect uniformity was maintained by using the same GPS unit.

3.4. Limitations

Habitat Zone C was mostly located within a fenced area from which grazing has been excluded since mid-September 2007. It is therefore considered that cattle grazing did not present a significant limitation for this aspect of the threatened species assessment.

3.5. Results

No specimens of Purple Diuris were recorded within Habitat Zone C during the current targeted survey. No other state or nationally listed rare or threatened flora was recorded during the current assessment.



Purple Diuris Habitat and Study Area



Legend

Study Area

Suitable Habitat - Purple Diuris

135 O'Herns Road. Epping - Threatened Species Assessment									
Figure 1: Purp	Figure 1: Purple Diuris - Suitable Habitat and Study Area								
Client: O'Herns	Client: O'Herns Road Developments Pty Ltd								
Project No.: 7193		Date: 10/12/2007		Created by: M. Wright					
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					Metres
0	40	80	160	240	320

4. STRIPED LEGLESS LIZARD

This section of the report describes the methods and results of the targeted Striped Legless Lizard (*Delma impar*) survey.

4.1. Background and existing information

Existing information on the status of the Striped Legless Lizard was obtained from the Viridians Victorian Fauna Database—also known as the Atlas of Victorian Wildlife (AVW)—being a public database held by the Department of Sustainability and Environment. The search area for the species was within a radius of 10 km with centre point having the following co-ordinates: latitude $37^{\circ}38' 23''$ S and longitude $145^{\circ}00' 35''$ E.

Further information on the location of records of this threatened lizard in the area and the broader region was obtained from:

 Melbourne 1,100:000 Mapsheets 7822 and 7922 - BioMaps with EVC and threatened species layers.

The AVW and Biomaps contained four previous records of the Striped Legless Lizard from within the 10 km search area. One of the records was from a native grassland beside the Merri Creek to the north of the study area. Two were from different locations at the Craigieburn Grasslands, which is located four kilometres to the north-west of the study area. The final record was from the Hanson Landfill site on the opposite side of Merri Creek to the Cooper Street Grasslands approximately 3 kilometres west of the study area.

The Striped Legless Lizard is listed as *vulnerable* under the *Commonwealth Environment Protection and Biodiversity Conservation Act* 1999 and is listed under the Victorian *Flora and Fauna Guarantee Act* 1988. The Striped Legless Lizard is considered to be *endangered* in Victoria (DSE 2007). Overall this species is considered to be of **national** conservation significance.

The Striped Legless Lizard inhabits dense native grasslands, often with rocky rises, that were once extensive on the volcanic plains west of Melbourne (Webster *et al.* 1992). It utilises rocks, soil cracks, burrows and grass tussocks for sheltering (Smith and Robertson 1999). Research on the species has found that it can also occur in grasslands dominated by introduced species, in secondary grasslands (Dorrough and Ash 1999, Koehler 2004, O'Shea 2004) and in habitats where rocks are absent but deep cracking clay soil is present (Coulson 1990).

Several other factors have been found to be important in determining the likelihood of this species occurring in a particular area (Koehler 2004, Dorrough and Ash 1999, Coulson 1990) including land use history and distance from primary grassland areas (Dorrough and Ash 1999, Coulson 1990). Continuity of suitable habitat is also likely to be important (Dorrough and Ash 1999).

Cultivation and intensive ploughing disturbs the soil, alters soil structure and may directly result in the death of individual Striped Legless Lizards (Coulson 1990). Intensive ploughing and extensive loss of habitat may result in local extinction of populations (Coulson 1990), although the species may in some cases occur in such areas. For example, in western Victoria the species has been found during ploughing on paddocks that had not been cultivated or ploughed for 20 to 25 years (Coulson 1990). It is not known whether the species had persisted in these areas, or recolonised from elsewhere. Similarly, Dorrough and Ash (1999) found that recent ploughing was more predictive of Striped Legless Lizard absence than past ploughing, and suggested that population recovery since ploughing may depend on dispersal from surrounding suitable habitat areas.



4.2. Site Description

The broader study area comprises grazing land dominated by exotic pasture grasses and weeds. However, a small patch of Stony Knoll Shrubland (Habitat Zone C) was recorded and it is described below as it was the focus of this survey.

The majority of **Habitat Zone C** included exposed basalt rock, and a dense cover of bryophytes and lichen existed at lower elevations. No tree canopy was present and the native understorey component of this vegetation was composed of the native species Hedge Wattle (*Acacia paradoxa*), Small Vanilla-Iily (*Arthropodium minus*), Common Rice-flower (*Pimelea humilis*), Curved Rice-flower (*Pimelea curviflora*) and several native grasses and forbs. The most abundant exotic plants included Cape Weed (*Arctotheca calendula*), Sweet Briar (*Rosa rubiginosa*) and Paterson's Curse (*Echium plantagineum*). The area has been used for grazing in the past and signs of degradation were present.

4.3. Survey methodology

Tile grid surveys were deemed to be the most appropriate method for detecting the lizard in the study area. The tile grid method has been previously used successfully to survey the Striped Legless Lizard in western Victoria (Koehler 2004) and in the basalt plains grasslands of Melbourne (O'Shea 2004).

The limited extent of suitable habitat meant that tiles were laid in one section of the study area. The location of the tiles was selected within potential habitat which included areas of Stony Knoll Shrubland and rocky areas, identified in a previous assessment as Habitat Zone C (Brett Lane and Associates Pty. Ltd. 2008). Figure 2 shows the locations of the tiles in relation to the native vegetation.

Seventy-three grooved terracotta roof tiles were placed across Habitat Zone C in a scattered formation, with tiles spaced approximately 5 metres apart. The tiles were individually numbered with a permanent marker. This method follows the standard Victorian survey technique used for Striped Legless Lizard monitoring by the Victorian Striped Legless Lizard Working Group.

The tiles were laid out in early September, 2007 and monitored at approximately fortnightly intervals. The first monitoring took place on 26th September and the final tile check on the 21st December 2007. Each tile was checked 6 times resulting in 438 tiles being checked.

The tiles were checked between 8am and 1pm. The time of checking the grids was randomised, so that the effect of time and temperature during monitoring days was not biased for a particular time. The weather conditions during the monitoring ranged from mild to hot and varied from overcast to clear skies. These conditions were considered to be suitable for detecting the Striped Legless Lizard using the tile grid method. The weather conditions of grids at the time of tile checking are summarised in Table 1.

Date		Notes				
	Ta (°C)	Tu (°C)	Tc (°C)	Ha (%)	Hu (%)	
26/10/2007	20	20	22	67	61	Mild, patchy and overcast cloud cover, light southerly wind
7/11/2007	27	32	40	40	44	Hot, clear skies, little to no wind

Table 1: Weather conditions recorded at the time of the tile grid checking



13/11/2007	33	36	42		Hot, clear skies, light easterly wind
22/11/2007	22	24	24		Mild, overcast, moderate southerly wind
7/12/2007	25	33	34	49	Warm, gentle south westerly wind, overcast
21/12/2007	26	31	35		Hot, moderate northerly wind, with clear skies

Notes: Ta: Ambient Temperature; Tu: Temperature under the tile; Tc: Temperature at surface of the tile; Ha: Relative humidity; Hu: Relative humidity under the tile.

During the targeted survey notes were taken on habitat quality and the criteria for assessing the habitat is described in the next section.

4.4. Habitat definitions and description

Striped Legless Lizards typically occur in basalt plains with deep cracking clay soils and scattered volcanic rocks across the surface. Cracking soil and rocks are important characteristic of habitat as they provide protection from fire and predators and also provide a place to lay eggs.

Three main habitat quality categories were used and described below.

High: Habitat components listed below are usually all present.

- High-density native tussock grassland present (e.g. Kangaroo Grass Themeda triandra, Wallaby Grass - Austrodanthonia spp. and Tussock Grass - Poa spp.)
- Large, extensive and continuous areas of native tussock grassland
- High proportions of surface and embedded rocks, and cracking soil
- Connectivity with other areas of suitable habitat.

Moderate: Some fauna habitat components are often missing although linkages with other remnant habitats in the landscape are usually intact.

- Some native tussock grassland present
- Large, extensive and continuous areas of mixed native and exotic grassland
- Some surface and embedded rocks, and cracking soil
- Some connectivity.

Low: Many habitat elements have been lost. Grassland habitats that are:

- Low density and small areas of native tussock grassland present
- Native tussock grassland species may be absent
- Surface and embedded rocks are often absent
- Isolated and little to no connectivity
- Showing signs of disturbance (such as soil erosion and compaction and/or grazing pressures).



Given the small and isolated area of the native vegetation present, its highly weed invaded nature and the limited connectivity to other large and extensive native grasslands in the region (such as Craigieburn Grassland) Habitat Zone C is considered to be *low* habitat quality for the Striped Legless Lizard.

4.5. Limitations

The timing of the Striped Legless Lizard survey, its duration and the weather conditions under which surveying was undertaken, were considered suitable for detecting the species. The tiles, which were used as the main method for detecting this species in the study area, do not trap the animals. Hence, it is important to time the monitoring to maximise the chances of detecting this species while the animals are utilising the tiles. Every effort was made during the current survey to ensure that monitoring took place under suitable conditions to detect the Striped Legless Lizard.

The overall survey effort (438 tile checks) was considered sufficient to detect significant populations of Striped Legless Lizard in the relatively small habitat zone.

4.6. Results

The Striped Legless Lizard was not recorded at the study area. One non-threatened reptile species was recorded under the tiles, the Bougainville's Skink (*Lerista bougainvillii*). The results of the tile grid survey are presented in Table 2.

Date	Vertebrate Fauna	Abundance
26/10/2007		
7/11/2007	Bougainville's Skink	1
13/11/2007		
22/11/2007	Bougainville's Skink	1
7/12/2007		
21/12/2007	Bougainville's Skink	1

Table 2: Results of tile grid surveys



Targeted Fauna Survey Locations



Metres

300

Legend



100

135 O'Hearns Road, Epping - Threatend Species Assessment							
Figure 2: Targeted Fauna Survey Locations							
Client: O'Herns Road Developments Pty Ltd							
Project No.: 7193		Date: 14/12/2007		Created by: I. Mau / D. Coppolino			
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5. GOLDEN SUN MOTH

This section describes the methods and results of the targeted Golden Sun Moth (Synemon plana) survey.

5.1. Background and existing information

Existing information on the status of the Golden Sum Moth was obtained from the Viridians Victorian Fauna Database—also known as the Atlas of Victorian Wildlife (AVW)—being a public database held by the Department of Sustainability and Environment. The search area for the species was within a radius of 10 km with centre point having the following co-ordinates: latitude $37^{\circ}38' 23''$ S and longitude $145^{\circ}00' 35'' E$.

The AVW contained 12 previous records of the Golden Sun Moth from the search area. The majority of the records were from Craigieburn Grassland Reserve (8 records) and the remaining (four) records from Campbellfield. These records were recent. Those dated December 2003 were recorded 6 kilometres to the north-west of the study area while those dated January 2004 were recorded 7 kilometres to the south-west of the study area.

The Golden Sun Moth is listed as a critically endangered species under the *Environment Protection and Biodiversity Conservation Act* 1999 and it is also listed as endangered under the *Flora and Fauna Guarantee Act* 1988. An action statement has been prepared for this species in Victoria (No. 106).

The Golden Sun Moth is a diurnally active moth that once had a widespread distribution in Victoria prior to clearing for agriculture, urban and industrial development. Its distribution is closely correlated with that of native grasslands dominated by Wallaby Grass (*Austrodanthonia* spp.) (Edwards 1993). In Victoria, the Golden Sun Moth is known from less than ten sites (O'Dwyer and Attiwill 2000). A large population has recently been found to persist in the Craigieburn grasslands (Van Praagh 2004). Other locations in Melbourne where this species has been recorded historically include Altona, Broadmeadows, Epping North (Aurora residential estate), Glenroy, Keilor, Reservoir, Tullamarine and Williamstown. This species is a highly specialised grassland inhabitant and occurs in grasslands that are dominated by Wallaby Grass (*Austrodanthonia* spp.) at a minimum of 40% cover (O'Dwyer and Attiwill 1999, O'Dwyer and Attiwill 2000). The life cycle of this moth is closely linked to that of the grass species. The recent records of the Golden Sun Moth from Craigieburn suggest that the species may persist in areas where suitable habitat is present.

Little is known about the reproductive life cycle of the Golden Sun Moth, although it is likely that it takes 2 to 3 years, as for other closely related moths. In general, female sun moths emerge from the pupa with fully developed eggs, ready to mate. After mating, the female deposits the eggs singly between the tillers of the food plant, and the soil, where they hatch in about 21 days. The larvae remain underground and feed on the roots of Wallaby Grass. When they are ready to pupate, the larvae prepare a tunnel to the surface through which the pupa eventually emerges. Although Golden Sun Moth females can fly, they tend to lay in wait, flashing their small bright orange wings to attract the attention of patrolling males. Ovipositioning in the species has not been observed (Common 1990, Van Praagh 2004). Dispersal appears to be low with a range of up to 100 metre estimated (Cook and Edwards 1993).

The Golden Sun Moth has been eliminated over much of its range. It is threatened by habitat loss, disturbance and fragmentation. The major cause of decline has been the loss of habitats because of agricultural expansion and urbanization.



5.2. Site Description

The broader study area comprises grazing land dominated by exotic pasture grasses and weeds. However, a small patch of Stony Knoll Shrubland (Habitat Zone C) was recorded and it is described below as it was the focus of this survey.

The majority of **Habitat Zone C** included exposed basalt rock, and a dense cover of bryophytes and lichen existed at lower elevations. No tree canopy was present and the native understorey component of this vegetation was composed of the native species Hedge Wattle (*Acacia paradoxa*), Small Vanilla-Iily (*Arthropodium minus*), Common Rice-flower (*Pimelea humilis*), Curved Rice-flower (*Pimelea curviflora*) and several native grasses and forbs. The most abundant exotic plants included Cape Weed (*Arctotheca calendula*), Sweet Briar (*Rosa rubiginosa*) and Paterson's Curse (*Echium plantagineum*). The area has been used for grazing in the past and signs of degradation were present.

5.3. Field Methodology

To determine the likelihood that the threatened Golden Sun Moth occurs at the study area a targeted survey was undertaken. The limited extent of suitable habitat meant that field surveys were performed only in areas of native vegetation being the Stony Knoll Shrubland (EVC 649) described as Habitat Zone C.

The study area was visited three times during suitable weather conditions on the 15th, 27th November and 6th December 2007 between 10:00 am and 3:00 pm.

On the first two visits one surveyor walked two transect lines traversing the appropriate parts of the study area (Figure 2). On the third visit, two surveyors walked the same two transects lines. Transect lines were 250 metres long with a search area of 5 metres either side of the transect line. Notes were taken on the suitability of habitat whilst at the survey sites.

5.4. Habitat definitions and description

The Golden Sun Moth requires a specialised habitat of grasslands dominated by Wallaby Grass. Many species of Wallaby Grass are low growing tussock grasses, usually separated by bare ground. Species composition and density of the grassland are important components to the survival of this species (Van Praagh 2004).

A critical density of Wallaby Grass is required because the moths lay their eggs at the base of the Wallaby Grass tussocks (Edwards 1995). Previous studies indicate that the species requires at least a 40% cover of Wallaby Grass for survival (O'Dwyer and Attiwill 1999), although recent findings suggest that small populations may persist in more disturbed habitats with less Wallaby Grass cover than what is considered optimal for the species.

Any disturbance to the soil is particularly destructive for these grass feeding moths. Soil disturbance destroys the subterranean larval stages in addition to killing the native perennial grasses that are their host plants (Douglas 2004).

Three main habitat quality categories are described below.

High: Habitat components listed below are usually all present.

- Grassland dominated by Wallaby Grass;
- At least 40% cover of Wallaby Grass;
- Bare ground present;
- Connectivity with other areas of suitable habitat.



Moderate: Some fauna habitat components are often missing although linkages with other remnant habitats in the landscape are usually intact.

- Grasslands dominated with exotic vegetation but has at least 25% cover of native vegetation;
- Some areas are dominated by Wallaby Grass;
- Some connectivity with other areas of suitable habitat.
- Grassland shows some evidence of disturbance (such as soil erosion, high weed invasion, high levels of Phosphorus in soils)

Low: Many habitat elements have been lost. Grassland habitats that are:

- Higher than 75% cover of exotic vegetation;
- Little or no areas that contain Wallaby Grass;
- Isolated (little or no connectivity);
- Showing signs of disturbance (e.g. cultivation, erosion, weed invasion).

Due to the highly degraded, heavily weed infested and small and isolated position of the stony knoll—Habitat Zone C—it is considered to be of *low* habitat quality for the Golden Sun Moth.

5.5. Limitations

Golden Sun Moths emerge from the ground after pupating from November to December. This is the ideal time to locate the presence of this species. The fieldwork was performed at the appropriate time for optimal results.

5.6. Results

Search efforts for the Golden Sun Moth were concentrated within Habitat Zone C as this was the area suspected of being suitable for the support and survival of the threatened moth. The two search transects were designed to traverse the remnant vegetation habitat and pasture described above (Figure 2).

Weather conditions on the days of surveys were chosen to be typical of the type of conditions that provide best activity chances for the moth. The weather condition on the days of search were clear sunny days, warm to hot (average temperature of the three days C. 28° C), fresh winds and relative humidity of 50–60 %.

The Golden Sun Moth was not found on the study area despite concentrated search efforts and suitable weather conditions. It is therefore considered that it is unlikely that it will occur on site.



6. IMPACTS AND REGULATORY IMPLICATIONS OF PROJECT

This section provides an outline of the regulatory issues related to the flora, fauna and native vegetation values present within the study area. The implications under various local, state and federal policies and legislation are discussed and recommendations and actions regarding these issues are provided.

6.1. Purple Diuris

Purple Diuris was not recorded during this current threatened species targeted assessment. Therefore, no further implications—other than those previously documented (Brett Lane & Associates Pty Ltd 2008)—are identified under relevant legislation and policies such as the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999, Victorian *Flora and Fauna Guarantee Act* 1988 and the Victorian Native Vegetation Management Framework. As such, no regulatory implications were identified in relation to Purple Diuris in the study area. For this reason, a referral to the Federal Minister under the *Environment Protection and Biodiversity Conservation Act* 1999 would not be required in this instance.

6.2. Striped Legless Lizard

Striped Legless Lizard was not recorded during this current threatened species targeted assessment. Therefore, no further implications—other than those previously documented (Brett Lane & Associates Pty Ltd 2008)—are identified under relevant legislation and policies such as the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999, Victorian *Flora and Fauna Guarantee Act* 1988 and the Victorian Native Vegetation Management Framework. As such, no regulatory implications were identified in relation to Striped Legless Lizard in the study area. For this reason, a referral to the Federal Minister under the *Environment Protection Act* 1999 would not be required in this instance.

6.3. Golden Sun Moth

Golden Sun Moth was not recorded during this current threatened species targeted assessment. Therefore, no further implications—other than those previously documented (Brett Lane & Associates Pty Ltd 2008)—are identified under relevant legislation and policies such as the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999, Victorian *Flora and Fauna Guarantee Act* 1988 and the Victorian Native Vegetation Management Framework. As such, no regulatory implications were identified in relation to Golden Sun Moth in the study area. For this reason, a referral to the Federal Minister under the *Environment Protection and Biodiversity Conservation Act* 1999 would not be required in this instance.



REFERENCES

Brett Lane and Associates Pty. Ltd. 2008. 135 O'Herns Road, Epping. Flora and Fauna and Net Gain Assessment. Report for Collie Pty Ltd. Report No. 7145(2.2), February 2008.

Common, I.F.B. 1990. Moths of Australia. Melbourne University Press, Carlton.

Cook, L. and Edwards T. 1993. Population Monitoring of Endangered Moth Synemon plana 1992-93, York Park, Barton. CSIRO Division of Entomology report to the National Capital Planning Authority.

Coulson, G. 1990. Conservation biology of the Striped Legless Lizard (*Delma impar*) an initial investigation. Report to the National Parks and Wildlife Division. Department of Conservation and Environment, Melbourne.

Dorrough, J., and Ash, J. E. 1999. Using past and present habitat to predict the current distribution and abundance of a rare cryptic lizard, *Delma impar* (Pygopodidae). Australian Journal of Zoology 24: 614-624.

Douglas, F. 2004. A dedicated reserve for conservation of two species of *Synemon* (Lepidoptera: Castniidae) in Australia. *Journal of Insect Conservation* (8)2-3:221-228

DSE 2005. Advisory List of Rare and Threatened Plants in Victoria. Department of Sustainability and Environment, Melbourne.

DSE 2007. Advisory List of Threatened Vertebrate Fauna in Victoria. Department of Sustainability and Environment, Melbourne.

Edwards, T. 1993. Golden Sun Moth. Australian Natural History 24 (16) 16-17.

Edwards, T. 1995. Synemon plana site, Belconnen Navel Station, Lawson. Management of relict lowland grasslands. Proceedings of a workshop and public seminar. ACT Parks and Conservation Service. *Conservation Series* 8 150-152.

Koehler, L. E. 2004. The current distribution, status and habitat preferences of the Striped Legless Lizard (*Delma impar*) in far south-western Victoria. Honours thesis. School of Applied Sciences, Applied Chemistry, RMIT University.

O'Dwyer, C. and Attiwill, P. M. 1999. A comparative study of habitats of the Golden Sun Moth Synemon plana Walker (Lepidoptera; Castniidae): implications for restoration. *Biological Conservation* 89: 131-141.

O'Dwyer, C. and Attiwill, P.M. 2000. Restoration of a native grassland as habitat for the Golden Sun Moth *Synemon plana* Walker (Lepidoptera; Castniidae;) at Mount Piper, Australia. Restoration Ecology 8, 170-174.

O'Shea, M. 2004. Methods for assessment and techniques for management of Striped Legless Lizard *Delma impar* populations in South-eastern Australia (DRAFT). PhD thesis. Victoria University of Technology, Victoria.

Smith, W. J. S., and Robertson, P. 1999. National Recovery Plan for the Striped Legless Lizard (*Delma impar*) 1999-2003. Unpublished report to Environment Australia, Canberra.

Van Praagh, B. D. 2004. New sightings of the Golden Sun Moth Synemon plana (Lepidoptera; Castniidae) at Craigieburn and Cooper St Grasslands, Melbourne Victoria 2003/2004. Unpublished report to the Department of Sustainability and Environment.

Webster, A., Fallu, R., and Preece, K. 1992. Action Statement No 17: Striped Legless Lizard *Delma impar*. Action Statement prepared under section 19 of the *Flora and Fauna Guarantee Act*



1988 under delegation from the Secretary, Department of Natural Resources and Environment. April, 1992.

