Stuart Cooney
Principal Ecologist
Ecolink Consulting Pty Ltd
PO Box 356
Northcote VIC 3070

Our Ref: 1610

12 February 2020

Claire and James Dennis
C/- Sonia Petering
8 Cedar Grove
Highton VIC 3216

Dear Claire and James,

Re: Offset Management Plan: 435 McDonnells Road, Ombersely, Victoria, Victoria

Ecolink Consulting was engaged by Claire and James Dennis to undertake a series of monitoring programs to evaluate the effectiveness of the management of an offset site, located on McDonnells Road, Ombersley (hereafter the study area: Figure 1). The 32 hectare offset site was established to offset for impacts to ecological values associated with the development of an industrial estate in Ravenhall, Victoria. This development was approved under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) via referral 2015/7486 on the basis that the proponent mitigate habitat losses for the nationally vulnerable Striped Legless Lizard *Delma impar* and approximately 18 hectares of the nationally threatened Natural Temperate Grasslands of Victorian Volcanic Plain (NTGVVP) ecological community.

An Offset Management Plan (OMP) for the offset site was prepared by Ecology and Heritage Partners Pty Ltd (2018). It prescribes a range of measures to ensure that the offset site is appropriately managed to preserve and enhance the ecological values offset within it (i.e. Striped Legless Lizards and NTGVVP). Section 8.3 of the OMP describes the requirements for Striped Legless Lizard surveys. Surveys are to be undertaken for an initial four year period and then in years 6, 8 and 10 of the OMP and thereafter upon written agreement with the Department of the Environment and Energy (Ecology and Heritage Partners Pty Ltd 2018). Section 8.2 of the OMP relates to the monitoring of NTGVVP and requires that vegetation monitoring is undertaken for an initial four year period and then in years 6, 8 and 10 of the management plan (Ecology and Heritage Partners Pty Ltd 2018).

This report presents the findings of the first of the Striped Legless Lizard surveys and first vegetation assessment, undertaken in summer 2019.

Striped Legless Lizard *Delma impar* Surveys

The Striped Legless Lizard is listed as 'Vulnerable' under Schedule 1 of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. It is also listed as threatened on the Victorian *Flora and Fauna Guarantee Act 1988*, and is 'Endangered' on the Department of Sustainability and Environment's (now DELWP's) *Advisory List of Threatened Vertebrate Fauna in Victoria* (Department of Sustainability and Environment 2013). The species has a national recovery plan for its protection, prepared in 1999 (Smith and Robertson 1999).

The Striped Legless Lizard is a pale grey lizard up to 30 centimetres in length. They have a prominent, linear darker brown vertebral stripe running from head to tail, with finer, paler stripes on either side (Cogger 2000; Wilson and Swan 2010). Like all members of the Pygopodidae family, they are legless, with no visible forelimbs and reduced hind limbs that are apparent only as small flaps on either side of the vent (SEWPaC 2013).

Plate 1. Striped Legless Lizard

Striped Legless Lizards are usually found native in tussock grasslands and woodland (Wilson and Swan 2010), often dominated by species such as Spear Grass *Austrostipa bigeniculata* and Kangaroo Grass *Themeda triandra* (Smith and Robertson 1999). However recent observations of the species have demonstrated that non-native plant species, and even secondary grasslands, can support individuals of this species (Smith and Robertson 1999). This has led to a hypotheses that it is not the provenance of the grass species that is important, rather the structural characteristics of the vegetation that determines if the habitat is suitable for Striped Legless Lizards (Department of Sustainability and Environment 2011; Smith and Robertson 1999). Within these habitats, Striped Legless Lizards are usually found sheltering underneath logs, rocks and other debris (Cogger 2000).

The Striped Legless Lizard was formerly distributed throughout temperate lowland grasslands in southern Australia (SEWPaC 2013). In Victoria, it is believed that the range of the species has contracted to southern parts of its former range, although it is no longer found close to inner metropolitan Melbourne (SEWPaC 2013). One of the largest extant populations of the species is found in Victoria on the Keilor plains at St Albans, west of Melbourne (SEWPaC 2013). There are

likely to be more than 1000 individuals of this species remaining in the wild, most of which occur in large reserves within the Victorian Volcanic Plain, although the precise size of the population is not known (SEWPaC 2013).

There are five historical record of Striped Legless Lizard from within 5 kilometres of the study area reported in the VBA (Figure 1) (Department of Environment Land Water and Planning 2020). These records are all from tile grids within the Dennis property. Other historic records supplied by the land-owner include 1 individual under Grid 7 in April 2015, and another two under Grid 7 in November 2016, and the shed skin of a possibly gravid female Striped Legless Lizard under Grid 6 in December 2106. Tile checks undertaken by Ecolink in 2017 and 2018 identified up to eight other individual Striped Legless Lizards underneath tiles in Grid 1 and 3. The current tile checks will provide more information about the species within the offset site.

Methods

Seven tile grids were surveyed within the study area (Figure 1). The grids are located in parts of the study area with considered to have the highest likelihood of providing habitat for the species. All grids comprise 50 terracotta roof tiles in a 5 x 10 metre grid. The tiles were placed prior to 2018 in consultation with the Dennis family (Figure 1). This ensured that the tiles had become established, and allowed more time for lizards to preferentially utilise the artificial habitat.

Tiles were checked on two occasions by Dr Stuart Cooney Principal Ecologist/Director of Ecolink Consulting Pty Ltd (Table 1). An additional two surveys were scheduled, but not undertaken due to delays in approvals and weather during late spring. Four surveys will be undertaken in subsequent years. Stuart is familiar with the species and has conducted dozens of similar tiling assessments for the species in the last decade. Surveys were undertaken under Permit No 10006840 issued by the Department of Environment and Industries.

The tiles were checked on fine days and during the morning to avoid high temperatures later in the day. As lizards thermo-regulate, tiles may be desirable for basking and maintaining temperatures for foraging or other activities. However, in higher temperatures, the tiles become too hot for lizards to remain underneath, or they may become active and move elsewhere to forage, therefore reducing the chance of detecting the species.

Table 1. Weather conditions for Striped Legless Lizard surveys undertaken in December 2019.

Date	Time	Temp (°C)	Under-tile Temp (°C)	Cloud Cover (8ths)
9 Dec 2019	9:30 – 11:40	24.5-34.1	22.7-33.4	8
17 Dec 2019	9:25 – 11:30	20.8-29.1	22.2-26.8	3

Results

No Striped Legless Lizards were recorded during the current surveys. Other lizards observed during the current assessment included Whites Skink *Liopholis whitii,* Robust Skink *Ctenotus robustus*, and Eastern Three-lined Skink *Acritoscincus duperreyi*.

A large number of ant nests were observed beneath tiles, particularly on the first survey. These nests were less common on the second survey, following disturbance earlier in the month from the first survey.

Discussion

Although no Striped Legless Lizards were detected during the current assessment, this is likely due to the delay in the survey period. Previous surveys for Striped Legless Lizards noted that the likelihood of detection was greater, earlier in the survey season (November), with fewer individuals observed in December (Ecolink Consulting Pty Ltd 2019). This may have been exacerbated by the hot weather during the first of the surveys, which makes the heats soaks, provided by the tiles less important to the metabolism of Striped Legless Lizards, and they are therefore more likely to be away from shelter foraging. The other skinks recorded on the first survey were extremely active and quickly fled from the disturbance of the tiles being turned.

Surveys will be undertaken early in next season's survey window to ensure that a greater spread of the season is captured in the 2020/21 survey period. Prior to these surveys, an additional three tile grids will be laid, as per the requirements of the OMP (Ecology and Heritage Partners Pty Ltd 2018).

Annual Detailed Vegetation Monitoring

The purpose of the ongoing monitoring of the vegetation within the study area is to determine whether management actions are improving the quality of habitat for Striped Legless Lizards and NTGVVP.

Methods

Monitoring of the vegetation included the following:

- An assessment of the quality and quantity of vegetation and composition of species, using the Department of Environment, Land, Water and Planning's endorsed Habitat Hectare assessment methods (Department of Sustainability and Environment 2004);
- Biomass levels (vegetation height and vegetation cover), assessed through 14 x 1m^2 sampling plots equidistant along the offset site; and,
- The extent, severity, trend and presence of current weed species and any new and emerging weed species.

The Habitat Hectare assessment was undertaken in accordance with the methodology prescribed within the *Vegetation Quality Assessment Manual – Guidelines for Applying the Habitat Hectares Scoring Method* (Department of Sustainability and Environment 2004). All indigenous vegetation was assessed, and then assigned a quality rating based on the Habitat Hectare score (Department of Sustainability and Environment 2004).

Results

A total of 56 flora species were recorded within the study area during the current assessment. This comprised 31 indigenous and 25 exotic plant species (Table A1, attached to this report).

The study area was dominated by Kangaroo Grass, Spear-grass, Rough Spear-grass *Austrostipa scabra* subsp. *falcata*, Bristly Wallaby-grass *Rytidosperma setaceum*, and Common Wallaby-grass *Rytidosperma caespitosum.* Other widespread species included Blue Devil *Eryngium ovinum*, Chocolate Lily *Arthropodium strictum*, Sheep's Burr *Acaena echinata and* Scaly Buttons *Leptorhynchos squamatus.* The cover abundance of native vegetation varied but generally was estimated to be approximately 70% of the total projective foliage cover over the entire offset site (Plate 2).

Plate 2. Dense swards of native grasses cover the study area

Weeds comprised the remaining cover and included species such as Bearded Oat *Avena fatua*, Brown-top Bent *Agrostis capillaris*, Rye-grasses *Lolium* spp., Toowoomba Canary-grass *Phalaris aquatica*, Onion Grass *Romulea rosea* and Large Quaking-grass *Briza maxima*. Rough Dog's-tail *Cynosurus echinatus* was also recorded during the assessment but was not recorded previously.

The patch of native vegetation within the study area, and the area that classifies as the NTGVVP ecological community was accurately recorded during assessment for the preparation of the OMP (Ecology and Heritage Partners Pty Ltd 2018).

Vegetation quality throughout the offset site was high, with a Habitat Hectare Score of 43 (out of 100) (Table 1).

Table 1. Habitat Hectare Score results

Bioregion			**Vic Volcanic Plain**
EVC name			**Low Rainfall Plains Grassland**
EVC number			**132_63**
Conservation rating within bioregion			**Endangered**
	Assessment Criteria	**Maximum Score**	**Patch Score**
Site Condition	a. Large old trees	10	N/A
	b. Canopy cover	5	N/A
	c. Understorey	25	5
	d. Lack of weeds	15	9
	e. Recruitment	10	6
	f. Organic litter	5	5
	g. Logs	5	N/A
	h. Total (sum of a-g)	75	25
Standardise Score (x 1.36)			34
Landscape valve	i. Patch size	10	8
	j. Neighbourhood	10	1
	k. Distance to core	5	0
l. Habitat Points (total)		**100**	**43**
m. Habitat score (l ÷ 100)			0.43

Biomass was assessed at 14 x 1m^2 sampling plots placed throughout the study area (Table 2: Figure 2). Inter-tussock space was generally less than 15%, lower than the optimum 20-40% as indicated in the Habitat Hectare Gain Scoring Manual (Department of Sustainability and Environment 2004), with total vegetative cover approaching 100%, except where rocks reduce this level of cover. The height of vegetation, however, was more than 10 cm in height at all of the monitoring plots. Heights were higher in areas containing Spear Grasses than those containing other tussocks, such as Kangaroo Grass and Wallaby Grasses.

Table 2. Results of the Biomass Plots

Number	Vegetation Height (cm)	Vegetative Cover (%)	Latitude	Longitude
1	30-40	80	143.77200	-38.26173
2	40-60	100	143.76810	-38.26018
3	30-40	50	143.76720	-38.25691
4	30-40	70	143.76520	-38.25691
5	30-40	60	143.76530	-38.25868
6	30-40	70	143.76710	-38.25850
7	50-60	90	143.76630	-38.26261
8	20-30	70	143.76920	-38.26246
9	20-30	90	143.76460	-38.26027
10	30-40	90	143.76480	-38.26105
11	30-40	70	143.76700	-38.26122
12	30-60	100	143.76900	-38.26157
13	20-30	90	143.77020	-38.26054
14	30-40	70	143.76660	-38.25731

Discussion

The OMP identifies 24 exotic species to be managed. The current assessment identified 25 species (Table A2, attached to this report). Biomass target levels are mandated at being a minimum of 10cm in height and with vegetation cover of no greater than 70% (Ecology and Heritage Partners Pty Ltd 2018). This was achieved in 50% of the biomass plots assessed during the current assessment, largely due to the presence of embedded rocks, and there most plots exhibited lower than expected inter-tussock space, compared to the EVC Benchmark. This suggests a higher biomass than would be expected in a pre-European state. We note that parts of the study area was burnt 6 years ago, although this did not materially make affect the findings of our report in terms of vegetative density, inter-tussock space and biomass.

Only one noxious weed was recorded by both assessments, Spear Thistle *Cirsium vulgare*. Only one plant was observed during the current assessment. This species is classified as Regionally Controlled within the Corangamite Catchment Management Area. This, and seven other species, have been identified as priority weeds. Priority weeds include exotic perennial species, some of which have an increased cover since the previous assessment; Bearded Oat, Couch, Perennial Rye-grass, Rough Dog's-tail, Toowoomba Canary-grass and Yorkshire Fog. It is understood that the proposed management regime includes pulse grazing and spot-spraying, and these management practices should continue.

Conclusion

Although no Striped Legless Lizards were observed during the current assessment, the habitat assessment demonstrates that the grasslands within the offset site remain suitable for the species, and continue to support the nationally threatened ecological community NTGVVP. It is expected that ongoing management of the offset site will increase the inter-tussock space and reduce biomass, which will further enhance the site of Striped Legless Lizards. Details of the required management actions are provided within the OMP (Ecology and Heritage Partners Pty Ltd 2018).

The next round of surveys will be undertaken in spring 2020.

I trust the above meets with your expectations, but please call me if you have any queries, or require any amendments.

Kind regards,

Stuart Cooney
Principal Ecologist
Ecolink Consulting Pty Ltd
Mobile: 0419 894 948

References

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

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Table A1. Flora species recorded during the current assessment

Origin	Common Name	Scientific Name	Weed of National Significance	Noxious Weeds Classification
*	Bearded Oat	*Avena barbata*	-	-
	Blue Devil	*Eryngium ovinum*	-	-
	Bristly Wallaby-grass	*Rytidosperma setaceum*	-	-
	Brown-back Wallaby-grass	*Rytidosperma duttonianum*	-	-
*	Brown-top Bent	*Agrostis capillaris*	-	-
*	Buck's-horn Plantain	*Plantago coronopus*	-	-
	Chocolate Lily	*Arthropodium strictum*	-	-
	Chocolate Lily	*Arthropodium* sp.	-	-
*	Clustered Dock	*Rumex conglomeratus*	-	-
	Common Bog-sedge	*Schoenus apogon*	-	-
	Common Tussock-grass	*Poa labillardierei*	-	-
	Common Wallaby-grass	*Rytidosperma caespitosum*	-	-
	Common Wheat-grass	*Anthosachne scabra*	-	-
*	Couch	*Cynodon dactylon* var. *dactylon*	-	-
*	Curled Dock	*Rumex crispus*	-	-
	Finger Rush	*Juncus subsecundus*	-	-
*	Flatweed	*Hypochaeris radicata*	-	-
	Grassland Wood-sorrel	*Oxalis perennans*	-	-
*	Hair Grass	*Aira* spp.	-	-
	Hairy Panic	*Panicum effusum*	-	-
	Hill Wallaby-grass	*Rytidosperma erianthum*	-	-
	Kangaroo Grass	*Themeda triandra*	-	-
	Kneed Spear-grass	*Austrostipa bigeniculata*	-	-
*	Large Quaking-grass	*Briza maxima*	-	-
*	Lesser Quaking-grass	*Briza minor*	-	-
	Long-hair Plume-grass	*Dichelachne crinita*	-	-
*	Narrow-leaf Clover	*Trifolium angustifolium* var. *angustifolium*	-	-
*	Onion Grass	*Romulea rosea*	-	-
*	Perennial Rye-grass	*Lolium perenne*	-	-
	Prickly Woodruff	*Asperula scoparia* subsp. *scoparia*	-	-
*	Ribwort	*Plantago lanceolata*	-	-
	Rigid Panic	*Walwhalleya proluta*	-	-
*	Rough Dog's-tail	*Cynosurus echinatus*	-	-
*	Rye Grass	*Lolium* spp.	-	-
	Scaly Buttons	*Leptorhynchos squamatus*	-	-

Origin	Common Name	Scientific Name	Weed of National Significance	Noxious Weeds Classification
*	Sheep Sorrel	*Acetosella vulgaris*	-	-
	Sheep's Burr	*Acaena echinata*	-	-
	Slender Bindweed	*Convolvulus angustissimus subsp. omnigracilis*	-	-
*	Slender Centaury	*Centaurium tenuiflorum*	-	-
	Slender Onion-orchid	*Microtis parviflora*	-	-
	Small Loosestrife	*Lythrum hyssopifolia*	-	-
*	Soft Brome	*Bromus hordeaceus*		
	Spear Grass	*Austrostipa* spp.	-	-
*	Spear Thistle	*Cirsium vulgare*	-	Regionally Controlled
*	Squirrel-tail Fescue	*Vulpia bromoides*	-	-
	Star Cudweed	*Euchiton sphaericus*	-	-
*	Subterranean Clover	*Trifolium subterraneum*	-	-
*	Sweet Vernal-grass	*Anthoxanthum odoratum*	-	-
*	Toowoomba Canary-grass	*Phalaris aquatica*	-	-
	Trefoil	*Lotus* spp.	-	-
	Wattle Mat-rush	*Lomandra filiformis*	-	-
	Weeping Grass	*Microlaena stipoides* var. *stipoides*	-	-
*	White Clover	*Trifolium repens* var. *repens*	-	-
*	Wimmera Rye-grass	*Lolium rigidum*	-	-
	Wiry Buttons	*Leptorhynchos tenuifolius*	-	-
	Yellow Rush-lily	*Tricoryne elatior*	-	-
*	Yorkshire Fog	*Holcus lanatus*	-	-

Table A2. Exotic Flora Species, Cover Abundance and Cover Targets

Origin	Common Name	Scientific Name	Cover (%) by EHP (2018)	Cover (%) by Ecolink (2019)	Weeds of National Significance	Noxious Weeds Classification	Priority Weed	Target (cover %)[1]
*	Bearded Oat	*Avena barbata*	<1	5	-	-	Yes	<1
*	Brown-top Bent	*Agrostis capillaris*	<1	5	-	-	-	<1
*	Buck's-horn Plantain	*Plantago coronopus*	<1	<1	-	-	-	<1
*	Capeweed	*Arctotheca calendula*	<1	<1	-	-	-	<1
*	Cat's Ear	*Hypochaeris radicata*	<1	<1	-	-	-	<1
*	Chickweed	*Stellaria media*	<1	<1	-	-	-	<1
*	Couch	*Cynodon dactylon* var. *dactylon*	10	5	-	-	Yes	<1
*	Curled Dock	*Rumex crispus*	-	<1	-	-	-	<1
*	Hair Grass	*Aira spp.*	<1	<1	-	-	-	<1
*	Hare's-foot Clover	*Trifolium arvense*	<1	<1	-	-	-	<1
*	Hop Clover	*Trifolium campestre* var. *campestre*	<1	<1	-	-	-	<1
*	Large Quaking Grass	*Briza maxima*	<1	3	-	-	-	<1
*	Lesser Quaking Grass	*Briza minor*	-	<1	-	-	-	<1
*	Onion Grass	*Romulea rosea*	<1	3	-	-	-	<1
*	Ox-tongue	*Helminthotheca echioides*	<1	<1	-	-	-	<1
*	Perennial Rye-grass	*Lolium perenne*	<1	3	-	-	Yes	<1
*	Ribwort	*Plantago lanceolata*	<1	<1	-	-	-	<1
*	Rough Dog's-tail	*Cynosurus echinatus*	-	3	-	-	Yes	<1
*	Salsify	*Tragopogon porrifolius* subsp. *porrifolius*	<1	<1	-	-	-	<1
*	Slender Centaury	*Centaurium tenuiflorum*	-	<1	-	-	-	<1
*	Smooth Cat's Ear	*Hypochaeris glabra*	5	-	-	-	-	<1

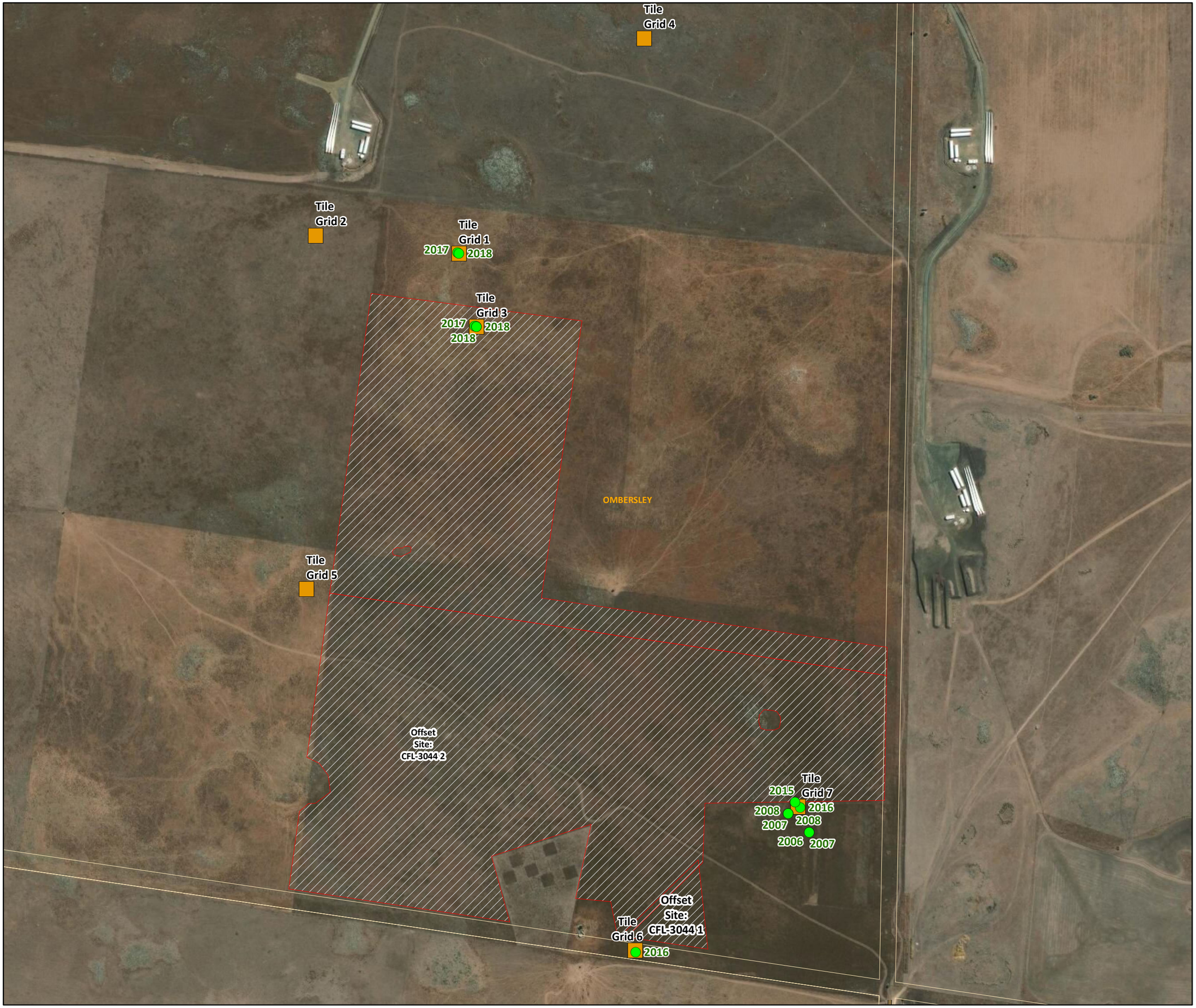
Origin	Common Name	Scientific Name	Cover (%) by EHP (2018)	Cover (%) by Ecolink (2019)	Weeds of National Significance	Noxious Weeds Classification	Priority Weed	Target (cover %)[1]
*	Soft Brome	*Bromus hordeaceus*	<1	<1	-	-	-	<1
*	Spear Thistle	*Cirsium vulgare*	<1	<1	-	Regionally Controlled	Yes	<1
*	Squirrel-tail Fescue	*Vulpia bromoides*	<1	<1	-	-	-	<1
*	Subterranean Clover	*Trifolium subterraneum*	-	<1	-	-	-	<1
*	Sweet Vernal-grass	*Anthoxanthum odoratum*	<1	<1	-	-	-	<1
*	Toowoomba Canary-grass	*Phalaris aquatica*	5	3	-	-	Yes	<1
*	Wimmera Rye-grass	*Lolium rigidum*	-	<1	-	-	-	<1
*	Yorkshire Fog	*Holcus lanatus*	5	3	-	-	Yes	<1

Figure 1: Striped Legless Lizard survey locations and historic observations

McDonnells Road, Birregurra

Legend

- Historic SLL Observations



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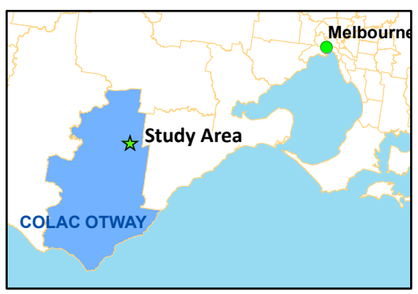

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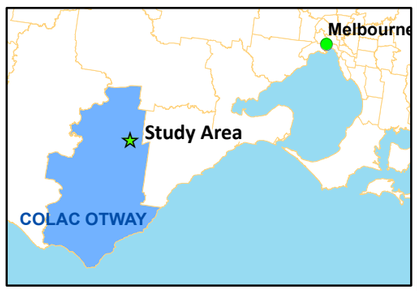
Figure 1: Biomass plot locations

McDonnells Road, Birregurra

Legend

- Study Area
- Biomass plot locations 2019

0 50 100 150 200 Meters



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