

96-166 CENTRE ROAD, NARRE WARREN

**DWARF GALAXIAS HABITAT BUFFER
BASELINE MONITORING**

**Narre Warren Central Pty Ltd
c/- The Fidus Group**



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1. INTRODUCTION

The Fidus Group, on behalf of Narre Warren Central Pty Ltd, engaged Brett Lane & Associates Pty Ltd (BL&A) to conduct baseline monitoring within Dwarf Galaxias habitat buffer areas at 96-166 Centre Road, Narre Warren, Victoria. The balance of this property is proposed for residential development. Condition 4 of the EPBC Act approval for the project (EPBC 2014-7380) requires that buffer areas around Dwarf Galaxias habitat (see Figure 1) are revegetated within 2 years of commencement of construction and that vegetation cover is retained until the expiry of the approval. This outcome must meet the following milestones:

- Less than 10% weed cover 6 months from the commencement of construction; and
- Less than 5% weed cover and at least 90% native vegetation cover 2 years from the commencement of construction.

The following monitoring must be undertaken to determine if these outcomes are being achieved:

- Prior to the commencement of construction to gain baseline data;
- 6 months after the commencement of construction;
- 12 months after the commencement of construction; and
- 2, 3, 5, 7, 10 and 15 years after the commencement of construction.

The current investigation reports on monitoring prior to the commencement of construction to gain baseline data. Specifically, the scope of this investigation included the estimation of native vegetation cover versus weed cover within the buffer areas along Dwarf Galaxias habitat. For this purpose, monitoring quadrats were established (1x1 metres in dimension) in representative areas.

This report is divided into the following sections:

Section 2 describes the methods used for the field survey.

Section 3 presents the assessment results.

Section 4 details recommendations to meet the targets outlined in condition 4 of the EPBC Act approval.

This investigation was undertaken by a team from BL&A comprising Elinor Ebsworth (Senior Ecologist), Greg Cranston (Botanist) and Inga Kulik (Senior Ecologist & Project Manager).

2. METHOD

The field assessment was conducted on the 10th October 2016. During this assessment, the study area was surveyed on foot, and monitoring quadrats were established within the Dwarf Galaxias Habitat Buffer (see Figure 1).

Quadrats were 1 x 1 metre in dimension. Placement of quadrats was intended to be representative of the whole study area, with ten quadrats placed in the dominant vegetation type (Swamp Scrub, EVC 53) and five in each of the other two vegetation types (Swampy Riparian Woodland (EVC 83) and non-native vegetation). The non-native vegetation areas are under Condition 4 of the EPBC Act Approval required to be revegetated with indigenous species. Quadrats were placed as close as possible to the existing drainage line to allow for the creation of ephemeral swales as additional Dwarf Galaxias habitat away from the drainage line. Quadrats were marked with a single wooden stake in the north-west corner, and angled along a north-south east-west axis. The top of each wooden stake was spray-painted pink to aid visibility for future monitoring rounds. In addition, GPS points were taken for each quadrat.

A photograph was taken at the north-west corner of the quadrat from 1.3 metres height, looking over the quadrat. The following data were also collected for each quadrat:

- Total vegetation cover;
- Native vegetation cover;
- Cover of weeds;
- Cover of bryophytes, bare ground and litter.

A full species list was also compiled for each quadrat. These data were then used to determine what percentage of the vegetation cover was comprised of native and exotic species.

3. RESULTS

20 quadrats were established in total. Ten of these were in areas mapped as Swamp Scrub (EVC 53), five were in Swampy Riparian Woodland (EVC 83) and five in non-native vegetation, which under Condition 4 of the EPBC Act Approval is required to be revegetated with indigenous species. Quadrat locations are shown in Figure 1.

Eight of the ten quadrats established in Swamp Scrub vegetation and two of the five quadrats established in Swampy Riparian Woodland vegetation were dominated ($\geq 50\%$ of total vegetation cover) by native species. The remaining two Swamp Scrub quadrats, three Swampy Riparian Woodland quadrats and all five non-native vegetation quadrats were dominated by exotic species. More detailed results of the baseline quadrat data are provided in Appendix 1.

Only one quadrat (in Swamp Scrub) has less than 10% weed cover, indicating that considerable weed control actions will be required to meet the EPBC Act approval benchmark of less than 10% weed cover 6 months from the commencement of construction.

The most commonly recorded species was the high-threat weed Blackberry, found in 19 of the 20 quadrats. Other high-threat weeds recorded included Spear Thistle (nine quadrats), Flax-leaf Broom (five quadrats) and Hawthorn (one quadrat). The native Swamp Paperbark (*Melaleuca ericifolia*) occurred in all ten Swamp Scrub quadrats, while Swampy Riparian Woodland quadrats included species such as Large Kangaroo-apple, Silver Wattle and fireweeds. Full species lists for each quadrat are provided in Appendix 2.



Legend

- Property boundary
- Access routes
- Dwarf Galaxias habitat
- Dwarf Galaxias habitat buffer
- Revegetation area
- Swamp Scrub (EVC 53)
- Swampy Riparian Woodland (EVC 83)

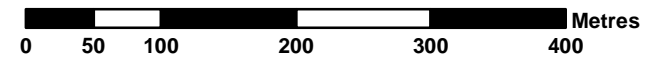


Figure 1: Vegetation monitoring sites

Project: 96-166 Centre Rd, Narre Warren

Client: Narre Warren Central Pty Ltd

Project No.: 14090

Date: 26/10/2016

Created By: K. Callister / E. Ebsworth



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4. RECOMMENDATIONS

As only one quadrat had less than 10% weed cover, considerable weed control actions will be required to meet the EPBC Act approval benchmark of less than 10% weed cover 6 months from the commencement of construction. All weed species will require treatment, but high-threat woody weeds and grass weeds should be given particular attention.

Mature woody weeds should be cut and swabbed using an appropriate herbicide. Woody weed seedlings should be spot-sprayed with appropriate herbicide. Grass-selective herbicides should be used for control of exotic grass species. The sensitive nature of the vegetation and associated waterways should be considered in selection of the most appropriate herbicide.

All weed control and revegetation actions are to be undertaken by a qualified and experience bushland contractor.

Appendix 1: Baseline quadrat data

Quadrat	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Type	SS	NNV	SS	SS	NNV	SS	SS	NNV	SS	SS	SRW	SRW	NNV	SRW	SRW	SS	NNV	SRW	SS	SS
Vegetation cover %	60	65	80	60	60	50	85	45	75	75	80	80	85	60	75	60	70	95	60	75
Bare ground cover %	1	20	2	1	15	20	5	35	2	5	30	30	1	30	10	2	10	2	15	10
Litter cover %	95	40	70	70	65	50	80	20	85	75	35	35	80	50	0	85	30	45	50	75
Bryophyte cover %	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of native species	1	1	1	1	1	1	1	0	1	1	1	4	1	2	5	2	1	2	3	2
Native cover %	60	10	40	55	0	30	65	0	65	45	50	25	0.25	40	15	45	0.25	5	45	60
Weed cover %	0.25	55	65	15	60	30	55	45	35	60	45	70	85	30	70	30	70	95	25	45
Weed cover (% of total vegetation cover)	0	85	62	21	100	50	46	100	35	57	47	74	100	43	82	40	100	95	36	43

Notes:

SS = Swamp Scrub (EVC 53);

SRW = Swampy Riparian Woodland (EVC 83); and

NNV = Non-native vegetation, to be revegetated with indigenous species under Condition 4 of the EPBC Act approval.

The sum of native cover and weed cover may be greater than the vegetation cover due to overlapping of vegetation. Weed cover (% of total vegetation cover) is determined using the following equation:
$$\frac{\text{weed cover}}{\text{native cover} + \text{weed cover}}$$

Appendix 2: Species recorded within monitoring quadrats during baseline monitoring

Quadrat		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Type		SS	NNV	SS	SS	NNV	SS	SS	NNV	SS	SS	SRW	SRW	NNV	SRW	SRW	SS	NNV	SRW	SS	SS
Scientific name	Common name																				
Native species																					
<i>Acacia dealbata</i>	Silver Wattle												Y			Y					
<i>Eucalyptus ovata</i>	Swamp Gum														Y						
<i>Melaleuca ericifolia</i>	Swamp Paperbark	Y		Y	Y		Y	Y		Y	Y					Y	Y			Y	Y
<i>Phragmites australis</i>	Common Reed		Y										Y							Y	
<i>Senecio glomeratus subsp. glomeratus</i>	Annual Fireweed					Y							Y			Y	Y				
<i>Senecio quadridentatus</i>	Cotton Fireweed														Y	Y			Y		
<i>Solanum laciniatum</i>	Large Kangaroo Apple											Y	Y	Y		Y		Y	Y	Y	Y
Introduced species																					
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass														Y	Y					
<i>Arctotheca calendula</i>	Cape weed												Y								
<i>Brassica fruticulosa</i>	Twiggy Turnip												Y								
<i>Cirsium vulgare</i>	Spear Thistle		Y			Y				Y	Y	Y	Y			Y			Y	Y	
<i>Conyza bonariensis</i>	Flaxleaf Fleabane								Y												
<i>Crataegus monogyna</i>	Hawthorn									Y											
<i>Cyperus eragrostis</i>	Drain Flat-sedge					Y						Y									
<i>Ehrharta erecta var. erecta</i>	Panic Veldt-grass												Y	Y			Y	Y	Y		Y
<i>Fumaria bastardii</i>	Bastard's Fumitory					Y			Y			Y									
<i>Fumaria capreolata</i>	White Fumitory									Y	Y										
<i>Galium aparine</i>	Cleavers	Y					Y	Y		Y	Y									Y	
<i>Genista linifolia</i>	Flax-leaf Broom								Y			Y	Y	Y					Y		
<i>Geranium dissectum</i>	Cut-leaf Crane's-bill		Y																		
<i>Helminthotheca echioides</i>	Ox-tongue		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y		Y		Y	Y		Y	Y
<i>Holcus lanatus</i>	Yorkshire Fog		Y						Y												
<i>Hypochaeris radicata</i>	Flatweed														Y						
<i>Isolepis levynsiana</i>	Tiny Flat-sedge														Y						
<i>Lepidium africanum</i>	Common Peppercross												Y	Y							
<i>Lysimachia arvensis</i>	Pimpernel																	Y			
<i>Lythrum hyssopifolia</i>	Small Loosestrife					Y															
<i>Oxalis spp.</i>	Wood Sorrel									Y											
<i>Cenchrus clandestinus</i>	Kikuyu				Y		Y		Y												
<i>Phalaris aquatica</i>	Toowoomba Canary-grass					Y											Y				
<i>Rubus fruticosus spp. agg.</i>	Blackberry		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<i>Rumex crispus</i>	Curled Dock		Y			Y								Y							
<i>Solanum nigrum s.s.</i>	Black Nightshade									Y		Y	Y	Y	Y	Y			Y		Y
<i>Sonchus asper s.l.</i>	Rough Sow-thistle	Y																			
<i>Sonchus oleraceus</i>	Common Sow-thistle	Y			Y			Y		Y	Y		Y	Y				Y		Y	
<i>Trifolium repens var. repens</i>	White Clover														Y						
<i>Vicia sativa</i>	Common Vetch				Y		Y		Y									Y			

Notes:

SS = Swamp Scrub (EVC 53);

SRW = Swampy Riparian Woodland (EVC 83); and

NNV = Non-native vegetation, to be revegetated with indigenous species under Condition 4 of the EPBC Act approval.

Appendix 3: Quadrat photos



Quadrat 01 (Swamp Scrub)



Quadrat 02 (Non-native vegetation)



Quadrat 03 (Swamp Scrub)



Quadrat 04 (Swamp Scrub)



Quadrat 05 (Non-native vegetation)



Quadrat 06 (Swamp Scrub)



Quadrat 07 (Swamp Scrub)



Quadrat 08 (Non-native vegetation)



Quadrat 09 (Swamp Scrub)








Quadrat 010 (Swamp Scrub)



Quadrat 11 (Swampy Riparian Woodland)



Quadrat 12 (Swampy Riparian Woodland)

		
Quadrat 13 (Non-native vegetation)	Quadrat 14 (Swampy Riparian Woodland)	Quadrat 15 (Swampy Riparian Woodland)
		
Quadrat 16 (Swamp Scrub)	Quadrat 17 (Non-native vegetation)	Quadrat 18 (Swampy Riparian Woodland)

		
Quadrat 19 (Swamp Scrub)	Quadrat 20 (Swamp Scrub)	