

96-166 CENTRE ROAD, NARRE WARREN

**DWARF GALAXIAS HABITAT BUFFER
SIX-MONTH 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 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, which has commenced. 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 six months after the commencement of construction to gain progress 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 during the baseline surveys in October 2016 (1x1 metres in dimension) in representative areas and revisited during this survey.

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 Greg Cranston (Botanist) and Inga Kulik (Senior Ecologist & Project Manager).

2. METHOD

The field assessment was conducted on the 11th September 2017. During this assessment, the study area was surveyed on foot, and previously established quadrats were monitored 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. Three quadrats established during baseline monitoring surveys in 2016 were determined to be too similar or close to others and were removed from the six-month monitoring (quadrats 12, 14 and 18). One other quadrat had been impacted by construction works and could not be located (quadrat 8), but only contained non-native vegetation. Another quadrat was inaccessible due to surrounding inundation (quadrat 4). 15 quadrats were monitored in total, nine quadrats were surveyed in the dominant vegetation type (Swamp Scrub, EVC 53) and two in the other native vegetation type present (Swampy Riparian Woodland, EVC 83), with a further four in 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 had previously been marked with a single wooden stake in the north-west corner, and were angled along a north-south east-west axis.

A photograph was taken at the north-west corner of the quadrat from 1.3 metres height, looking over the quadrat. The following data was 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. This data was then used to determine what percentage of the vegetation cover was comprised of native and exotic species.

3. RESULTS

15 quadrats were surveyed in total. Nine of these were in areas mapped as Swamp Scrub (EVC 53), two were in Swampy Riparian Woodland (EVC 83) and four 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 nine quadrats surveyed in Swamp Scrub vegetation were dominated ($\geq 50\%$ of total vegetation cover) by native species. The remaining one Swamp Scrub quadrat, two Swampy Riparian Woodland quadrats and all four non-native vegetation quadrats were dominated by exotic species. More detailed results of the baseline quadrat data are provided in Appendix 1.

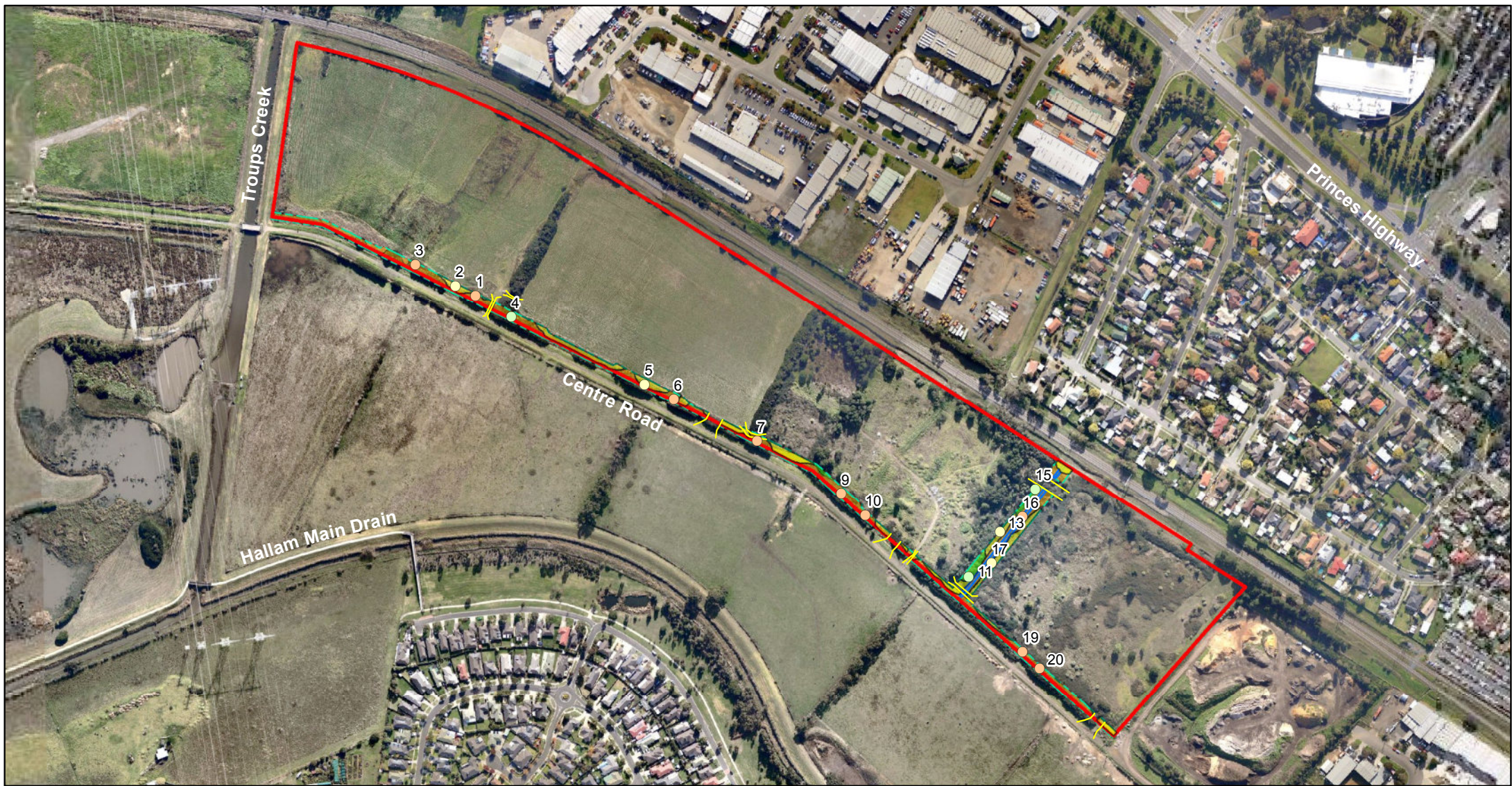
Only one quadrat (in Swamp Scrub) has less than 10% weed cover, indicating that considerable weed control actions will be required to meet the EPBC Act approval benchmark of less than 10% weed cover 6 months from the commencement of construction.

The most commonly recorded species was the high-threat weed Blackberry, found in 12 of the 15 quadrats surveyed. Other high-threat weeds recorded included Spear Thistle (three quadrats), Flax-leaf Broom (two quadrats) and Hawthorn (one quadrat). The native Swamp Paperbark (*Melaleuca ericifolia*) occurred in all nine Swamp Scrub quadrats surveyed, while Swampy Riparian Woodland quadrats included species such as Large Kangaroo-apple and Silver Wattle. Full species lists for each quadrat are provided in Appendix 2.

3.1. Limitations

This six-month monitoring survey was undertaken in early spring, one month earlier than the baseline survey the previous year. This is likely the reason species diversity is lower in the current survey than the baseline survey, with many species germinating in the month following this survey.

Quadrat 4 was inaccessible at the time of the current survey, but it remains possible that it could be surveyed during future monitoring rounds. Quadrat 8 was removed after the area was disturbed and the marking stake lost. Quadrats 12, 14 and 18 were not surveyed after it was decided that they were too close to other monitoring quadrats and would not add any additional information.



Legend

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

0 50 100 200 300 400 Metres

Figure 1: Vegetation monitoring sites

Project: 96-166 Centre Rd, Narre Warren

Client: Narre Warren Central Pty Ltd

Project No.: 14090

Date: 12/09/2017

Created By: N. May/ G. Cranston

BL&A

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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: Six-month survey quadrat data

Quadrat	1	2	3	4	5	6	7	9	10	11	13	15	16	17	19	20
Type	SS	NNV	SS	SS	NNV	SS	SS	SS	SS	SRW	NNV	SRW	SS	NNV	SS	SS
Vegetation cover %	60	55	85	ns	60	75	85	60	80	90	90	65	60	80	85	90
Bare ground cover %	0	25	2	ns	2	5	1	0	0	10	0	15	5	10	2	2
Litter cover %	100	50	75	ns	45	70	90	80	75	70	80	70	70	30	85	80
Bryophyte cover %	0	0	0	ns	0	0	0	0	0	0	0	0	0	0	0	0
Native cover %	60	15	45	ns	3	70	70	45	50	35	0	35	55	0	80	75
Weed cover %	<1	40	75	ns	60	30	20	20	45	60	90	40	15	80	10	40
Weed cover (% of total vegetation cover)	0	73	63	ns	95	30	22	31	47	63	100	53	21	100	11	35

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.

ns = Not surveyed due to inaccessibility

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 six-month monitoring

Quadrat		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Type		SS	SRW	SRW	SRW	SRW	SRW	SRW	SRW	SRW	SRW	SRW	SRW	SRW	SRW	SRW	SRW	SRW	SRW	SRW	SRW
Scientific name	Common name																				
Native species																					
<i>Acacia dealbata</i>	Silver Wattle				ns											Y					
<i>Melaleuca ericifolia</i>	Swamp Paperbark	Y		Y	ns		Y	Y	Y	Y				Y	Y			Y	Y		
<i>Phragmites australis</i>	Common Reed		Y		ns																
<i>Senecio glomeratus</i> subsp. <i>glomeratus</i>	Annual Fireweed				ns	Y															
<i>Solanum laciniatum</i>	Large Kangaroo Apple				ns							Y									
Introduced species					ns																
<i>Cirsium vulgare</i>	Spear Thistle	Y	Y		ns														Y		
<i>Cyperus eragrostis</i>	Drain Flat-sedge		Y		ns	Y										Y					
<i>Ehrharta erecta</i> var. <i>erecta</i>	Panic Veldt-grass				ns					Y			Y					Y		Y	
<i>Fumaria bastardii</i>	Bastard's Fumitory				ns	Y															
<i>Galium aparine</i>	Cleavers	Y			ns		Y	Y	Y	Y											
<i>Genista linifolia</i>	Flax-leaf Broom				ns							Y	Y								
<i>Geranium dissectum</i>	Cut-leaf Crane's-bill		Y		ns																
<i>Crataegus monogyna</i>	Hawthorn				ns				Y												
<i>Helminthotheca echioides</i>	Ox-tongue		Y		ns		Y	Y	Y												
<i>Oxalis</i> spp.	Wood Sorrel				ns				Y												
<i>Cenchrus clandestinus</i>	Kikuyu				ns		Y												Y		
<i>Phalaris aquatica</i>	Toowoomba Canary-grass				ns	Y	Y			Y											
<i>Rubus fruticosus</i> spp. <i>agg.</i>	Blackberry		Y	Y	ns		Y	Y	Y	Y	Y	Y	Y	Y				Y	Y	Y	
<i>Rumex crispus</i>	Curled Dock				ns	Y															
<i>Sonchus oleraceus</i>	Common Sow-thistle				ns				Y												
<i>Vicia sativa</i>	Common Vetch				ns					Y											
<i>Lotus uliginosus</i>	Greater Bird's-foot Trefoil				ns	Y															

Notes:

SS = Swamp Scrub (EVC 53);

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

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Appendix 3: Quadrat photos



Quadrat 01 (Swamp Scrub)



Quadrat 02 (Non-native vegetation)



Quadrat 03 (Swamp Scrub)



Quadrat 05 (Non-native vegetation)



Quadrat 06 (Swamp Scrub)



Quadrat 07 (Swamp Scrub)



Quadrat 09 (Swamp Scrub)



Quadrat 010 (Swamp Scrub)



Quadrat 11 (Swampy Riparian Woodland)



Quadrat 13 (Non-native vegetation)



Quadrat 15 (Swampy Riparian Woodland)



Quadrat 16 (Swamp Scrub)



Quadrat 17 (Non-native vegetation)



Quadrat 19 (Swamp Scrub)



Quadrat 20 (Swamp Scrub)