Caring for our Country project 'Urban Waterways' 2012-13

Results of quadrat surveys at Bababi Djinanang Grasland Reserve, Fawkner and Rushwood Drive Reserve, Craigieburn

Merri Creek Management Committee, report for Caring for Our Country, April 2014

CARING FOR OUR COUNTRY

Introduction

This project treated the weeds within buffer zones of grassland reserves; Bababi Djinanang, Fawkner and Craigieburn Grassland Reserve (Galgi Ngarrk), Wollert and in the Merri Creek habitat corridor at Rushwood Drive Reserve in Craigieburn. Treating weeds increased the quality of the remnant vegetation in nature reserves on the interface with industry and amenity parkland, increasing its ability to resist further weed influxes from adjacent weed-dominated landscapes. In this way the resilience of the general nature reserve areas was increased.

Specifically;

Rushwood Drive: targeted serious grassy weeds in remnant escarpments adjacent to industrial property fencelines.

Galgi Ngarrk: focused on woody weeds on escarpments above the bed and banks along the western boundary of the 400 hectare Craigieburn Grassland (Galgi Ngarrk) reserve. This consolidated landscape-scale riparian removals conducted by Melbourne Water (2008 - 2012).

Bababi Djinanang: an ecological burn, follow up grassy weed control and direct seeding in an area of the reserve which was recently added along the western flank of the grassland and which includes a complex mosaic of vegetation qualities.

Under the Caring for Our Country (CfoC) 2012-13 'Urban waterways' Grant, Merri Creek Management Committee established six permanent vegetation quadrats, three at Rushwood Drive Reserve and three at Bababi Djinanang Grassland Reserve. Most of the quadrat locations were chosen to include some sites where intensive work under the CfoC grant was immanent, with the intention of documenting some of the resulting quality changes.

Data from 10x10m quadrats was analysed to produce estimates of cover of indigenous versus exotic plants, cover of priority weeds and numbers of species of the different plants.

Grassland vegetation is highly dynamic due to seasonal and cyclic variation related to the relatively high frequency of burns that are applied to emulate traditional burning practices of Aboriginal peoples. Over the relatively short interval between the set-up of the quadrats (November 12 to July 13) for Rushwood Drive and October 12 to December 2013 for Bababi Djinanang, some of the changes in vegetation quality resulting from actions were yet to be realised in cover data.

However, for the sites where intensive work had occurred, definite improvements in the priority weed cover were apparent that could be related to ecological burning and targeted weed control conducted under this grant

Improvements in quadrat survey methods would include ensuring re-surveys take place in a standard season (grant constraints led to a non-preferred re-survey date for Rushwood Drive) and improving the consistency of cover estimation and plant identification through increased training and mentoring of filed staff.

The permanent quadrat locations provide an ongoing benefit for these sites, providing a baseline against which ongoing management actions can be evaluated.

Rushwood Drive, results of quadrat data before and after CfoC project

				Quadrat Code	RW1		RW 2		RW3	
				ZONE	The Tongue		Themeda patch		Behind factory	
				Month surveyed	Nov-12*	Jul-13	Nov-12	Jul-13	Nov-12	Jul-13
			Exotics							
POACEAE	*	p	***Agrostis capillaris***	**Brown-top Bent**			0.01			
POACEAE	*		*Avena barbata*	Bearded Oat			6		1	
POACEAE	*		*Briza maxima*	Large Quaking-grass		0.01	2		0.01	6
POACEAE	*		*Briza minor*	Lesser Quaking-grass			2			
POACEAE	*		*Bromus diandrus*	Great Brome	10	0.01			0.01	
POACEAE	*		*Bromus hordaceus*	Soft Brome			2	4	0.01	4
GENTIANACEAE	*		*Centaurium tenuiflorum*	Centaury			0.01	0.01		
POACEAE	*	p	***Dactylis glomerata***	**Cocksfoot**	10	0.01	8	4	0.01	
POACEAE	*	p	***Ehrharta erecta***	**Panic Veldt Grass**					4	0.01
POACEAE			*Ehrharta longiflora*	Annual Veldt Grass						4
FUMARIACIEAE	*		*Fumaria muralis*	Fumaria						0.01
RUBIACEAE	*		*Galium aparine*	Cleavers					0.01	
ASTERACEAE	*	p	***Helminthotheca echioides***	**Ox-tongue**		0.01	0.01	0.01	0.01	0.01
POACEAE	*		*Holcus lanatus*	Yorkshire Fog			16		10	
ASTERACEAE	*		*Leontodon taraxacoides*	Hairy Hawkbit			0.01		0.01	1
POACEAE	*		*Lolium perenne*	Perennial Rye-grass			8		2	
POACEAE	*	p	***Nassella neesiana***	**Chilean Needle-grass**			10	10	4	4
OXALIDACEAE	*	p	***Oxalis glabra***	**Finger -leaf Oxalis**			0.01	0.01		
OXALIDACEAE	*	p	***Oxalis pes-capreae***	**Soursob**					0.01	
POACEAE	*	p	***Paspalum dilatatum***	**Paspalum**	15					
POACEAE	*	p	***Pennisetum clandestinum***	**Kikuyu**					30	4
POACEAE	*	p	***Phalaris aquatica***	**Toowoomba Canary-grass**	60	0.01	2	2	4	
PLANTAGINACEAE	*	p	***Plantago lanceolata***	**Ribwort**	5		2		2	2
BRASSICACEAE	*	p	***Rapistrum rugosum***	**Giant Mustard**				0.01	0.01	0.01
IRIDACEAE	*		*Romulea rosea*	Common Onion-Grass	1	0.01	0.01	4		
ROSACEAE	*	p	***Rosa rubiginosa***	**Sweet Briar**			0.01			
ROSACEAE	*	p	***Rubus anglocandicans***	**Blackberry**			0.01			
ASTERACEAE	*		*Sonchus asper*	Milk Thistle					0.01	
ASTERACEAE	*		*Sonchus oleraceus*	Milk Thistle				0.01	0.01	0.01
FABACEAE	*		*Trifolium sp.*	Clover			1			
FABACEAE	*	p	***Ulex europaeus***	**Gorse**			0.01			
FABACEAE	*		*Vicia sativa*	Common Vetch			1	0.01	0.01	0.01
POACEAE	*		*Vulpia bromoides*	Squirrel-tail Fescue			4			
			Indigenous							
POACEAE	n		*Austrostipa semibarbata*	Fibrous Spear-grass		1				
RANUNCULACEAE	n		*Clematis microphylla* s.l.	Small-leaved Clematis					0.01	0.01
CONVULVULACEAE	n		*Dichondra repens*	Kidney-weed					0.01	
ONAGRACEAE	n		*Epilobium hirtigerum*	Hairy Willow-herb					0.01	
POACEAE	n		*Microlaena stipoides*	Weeping Grass	1	2	8	8	8	12
OXALIDACEAE	n		*Oxalis perennans*	Grassland Wood-sorrel					0.01	
POACEAE	n		*Poa labillardierei var. labillardierei*	Common Tussock-grass	1	0.01				0.01
ROSACEAE	n		*Rubus parvifolius*	Small-leaf Raspberry					3	3
POACEAE	n		*Rytidosperma racemosum*	Branched Wallaby-grass			1	1		

POACEAE	n		*Rytidosperma setaceum*	Small-flowered Wallaby Grass		1				
POACEAE			*Rytidosperma spp TBC*						4	4
CYPERACEAE	n		*Schoenus apogon*	Common Bog-sedge			0.01	0.01		
POACEAE	n		*Themeda triandra*	Kangaroo Grass			40	30	18	10
SCROPHULARIACEAE	n		*Veronica gracilis*	Slender Speedwell			2	0.01		
Vegetation			**Number of native species**		2	4	5	5	8	6
			Percentage native vegetation cover		2	4.01	51.01	39.02	33.04	29.02
			Number of exotic species		6	6	22	11	20	13
			Percentage cover of exotic species		101.00	0.06	64.09	24.06	57.12	25.06
			Number priority weeds		4	3	10	6	9	6
			Percentage cover priority weeds		90.00	0.03	22.06	16.03	44.04	10.03
			Total number of species (native and exotic)		8	10	27	16	28	19
			Total percentage vegetation cover (native and exotic)		103	4.07	115.1	63.08	90.16	54.08
Groundlayer			Rocks		2	2	1	1	13	13
			Logs		0	0	0	2	0	0
			Litter		0	0	0.01	25	0.01	2
			Bare Ground		0	0	4	10	0	47
Total Cover (Percentage)					105	101.07	120.11	101.08	103.17	116.08

* Based on estimates as treatment had begun prior to the baseline survey.

Results of CfoC grant works

RW1 A weedy part of the reserve consisting of 90% high priority weeds. Approximately 300m2 was treated using this approach.

- This site was treated for weeds using broadscale treatments that denuded the site of vegetation although a couple of indigenous plant species were retained.
- The second survey shows the site almost entirely covered in jute.
- Two additional indigenous species have been planted although these still only cover a very small percentage of the ground as they had been planted less than a month before survey.
- Regrowth of the former weed species was evident but as these had recently been treated at the time of the survey, future surveys would probably show these had been further reduced or eliminated.

RW2 Represents better quality areas of the interface with approximately 50 % indigenous plant cover. The intermingled exotic vegetation included a high component of lower priority annual grassy weeds and only about 20% high priority weeds. Approximately 1500m2 was treated using this approach.

- Biomass reduction conducted under this grant reduced vegetation cover from 115% to 63%.
- Little reduction is apparent in the high priority weed percentage figure owing to the repeat assessment being conducted before treatment of weeds had taken effect. Regrowth from the biomass reduction carried out earlier in the project had only recently attained a sufficient level of regrowth for effective treatment. The recently applied treatment is evident in the photopoint for this site.

RW 3 A rocky zone, with a similar mixed quality as RW2 although with a higher proportion of perennial, priority weeds, (44% versus 22%) including the high threat weed, *Pennisetum clandestinum* (Kikuyu).

- Biomass reduction burning reduced vegetation cover substantially from 90% to 54%.
- Three indigenous species were not re-detected at the end of the survey, although these are small species with a high variability in seasonal apparency (due to grant period, the repeat survey took place in the winter after the initial summer survey). One species (*Poa labillardierei*), only became apparent after the treatment.
- A significant reduction from 30% to 4% cover in the high threat weed, Kikuyu, (*Pennisetum clandestinum*) is significant as this was the most immanent threat to the continued survival of remnants in this interface zone and threatened diverse higher quality remnants in the interior of the reserve. The elimination of this weed was continuing at the time of this survey with a recent herbicide treatment on remaining cover.
- An increase in the cover of annual weeds was apparent, presumably due to the increase in bare ground. An increase in the indigenous grass, *Microlaena stipoides* was one of the positive early indications of assisted natural regeneration in areas treated under this grant.

Bababi Djinanang, results of quadrat data before and after CfoC project

				Quadrat Code	1 Rocky Esc		2 Weedy		3 Better quality	
				ZONE	E		C		W	
				Month burnt	Mar-11	Mar-11	Apr-10	Apr-13	Feb-12	Feb-12
				Month surveyed	Oct-12	Dec-13	Oct-12	Dec-13	Oct-12	Dec-13
				Months regrowth	**19**	**33**	**30**	**8**	**8**	**21**
Family			**Scientific name**	**Common name**						
			Exotics							
POACEAE	*		*Aira caryophyllea*	Silvery Hair-grass			0.01	**1**	0.01	**0.01**
PRIMULACEAE	*		*Anagallis arvensis*	Scarlet Pimpernel			0.01			
POACEAE	*		*Avena barbata*	Bearded Oat	5	28	2	55	1	2
POACEAE	*	p	***Brachypodium distachyon***	**Purple false brome**		**0.01**				
BRASSICACEAE	*	p	***Brassica fruticulosa***	**Twiggy Turnip**	0.01	0.01	**2**	**0.01**		
POACEAE	*		*Briza maxima*	Large Quaking-grass	3	1			2	2
POACEAE	*		*Briza minor*	Lesser Quaking-grass		0.01	1	5	0.01	0.01
POACEAE	*		*Bromus diandrus*	Great Brome			1	0.01		
GENTIANACEAE	*		*Centaurium erythraea*	Common Centaury			0.01	0.01	0.01	
ASTERACEAE	*	p	***Conyza spp.***	**Fleabane**			**2**	**0.01**		
POACEAE	*	p	***Dactylis glomerata***	**Cocksfoot**	**1**	**2**	**5**	**1**		
POACEAE	*		*Gastridium phleoides*	Nit grass				0.01		
ASTERACEAE	*	p	***Helminthotheca echioides***	**Ox-tongue**	**2**		**1**	**0.01**	**1**	**1**
POACEAE	*		*Holcus lanatus*	Yorkshire Fog	0.01	0.01				
ASTERACEAE	*		*Hypochoeris radicata*	Cat's Ear			1		0.01	0.01
LINACEAE	*		*Linum trigynum*	French Flax	0.01	0.01				
MALVACEAE	*	p	***Modiola caroliniana***	**Carolina Mallow**			**1**			
POACEAE	*	p	***Nassella hyalina***	**Cane Needle Grass**			**10**			
POACEAE	*	p	***Nassella neesiana***	**Chilean Needle-grass**	**1**	**0.01**	**60**	**35**	**10**	
POACEAE	*	p	*Nassella trichotoma*	Serrated Tussock			1	0.01		
POACEAE	*	p	***Paspalum dilatatum***	**Paspalum**			**8**	**0.01**		
POACEAE	*	p	***Phalaris aquatica***	**Toowoomba Canary-grass**	**3**	**3**			**3**	
PLANTAGINACEAE	*	p	***Plantago lanceolata***	**Ribwort**	**1**	**2**	**5**	**5**	**3**	**4**
IRIDACEAE	*		*Romulea rosea*	Common Onion-Grass					0.01	
ROSACEAE	*	p	***Rosa rubiginosa***	**Sweet Briar**	**0.01**	**0.01**			**1**	**0.01**
ASTERACEAE	*		*Sonchus oleraceus*	Milk Thistle	0.01	0.01		0.01	0.01	0.01
FABACEAE	*		*Trifolium campestre*	Hop Clover				0.01	0.01	
FABACEAE	*		*Vicia sativa*	Common Vetch	0.01	0.01			5	
POACEAE	*		*Vulpia bromoides*	Squirrel-tail Fescue	1			2		
			Indigenous							
ROSACEAE	n		*Acaena ovina*	Australian Sheep's Burr			1	0.01		
CASUARINACEAE	n		*Allocasuarina verticillata*	Drooping Sheoak	3	1				
LILIACEAE	n		*Arthropodium strictum*	Chocolate Lily					2	0.01
RUBIACEAE	n		*Asperula conferta*	Common Woodruff			1	1	0.01	0.01
POACEAE	n		*Austrostipa bigeniculata*	Kneed Spear-grass			2	0.01		
POACEAE			*Austrostipa spp TBC*		4	6				
PITTOSPORACEAE	n		*Bursaria spinosa*	Sweet Bursaria	5	5				
ASTERACEAE	n		*Calocephalus citreus*	Lemon Beauty-heads					5	1
RANUNCULACEAE	n		*Clematis microphylla* s.l.	Small-leaved Clematis	0.01	2				

LILIACEAE	n		*Dianella amoena*	Flax-lily	5	2			2	1
POACEAE	n		*Dichelachne crinita*	Long-hair Plume-grass					1	
POACEAE	n		*Elymus scaber*	Common Wheat-grass	5	0.01			2	0.01
ONAGRACEAE	n		*Epilobium hirtigerum*	Hairy Willow-herb			1			
GERANIACEAE	n		*Geranium retrorsum sensu lato*	Grassland Crane's-bill					0.01	0.01
HALORAGACEAE	n		*Haloragis heterophylla*	Variable raspwort						0.01
POACEAE	n		*Lachnagrostis filiformis var. 1*	Common Blown-grass				0.01		
XANTHORRHOEACEAE	n		*Lomandra filiformis*	Wattle Mat-rush	3	3			2	0.01
VIOLACEAE	n		*Melicytus sp. aff. dentatus (Volcanic Plains)*	Plains Tree Violet	10	3				
POACEAE	n		*Microlaena stipoides*	Weeping Grass		3				
OXALIDACEAE	n		*Oxalis perennans*	Grassland Wood-sorrel			0.01	0.01	0.01	0.01
POACEAE	n		*Poa labillardierei var. (Volcanic Plains)*	Plains Tussock Grass	1	0.01	1	0.01		
POACEAE	n		*Poa morrisii*	Soft Tussock-grass					2	2
POACEAE	n		*Poa sieberiana ssp?*	Grey Tussock-grass					1	1
POLYGONACEAE	n		*Rumex dumosus*	Wiry Dock					2	
POACEAE	n		*Rytidosperma fulvum*	Wallaby grass						0.01
POACEAE			*Rytidosperma spp TBC*				1		3	
CYPERACEAE	n		*Schoenus apogon*	Common Bog-sedge			0.01			
ASTERACEAE	n		*Senecio quadridentatus(sensu lato)*	Cotton Fireweed	0.01	0.01	1	0.01		
POACEAE	n		*Themeda triandra*	Kangaroo Grass	60	35	3	1	70	93
ANTHERICACEAE	n		*Tricoryne elatior*	Yellow rush-lily		1				0.01
SCROPHULARIACEAE	n		*Veronica gracilis*	Slender Speedwell					1	1
CAMPANULACEAE	n		*Wahlenbergia communis*	Tufted Bluebell					2	0.01
Vegetation			**Number of native species**		11	13	10	8	16	16
			Percentage native vegetation cover		96.02	61.03	11.02	2.06	95.03	99.1
			Number of exotic species		14	14	17	17	15	9
			Percentage cover of exotic species		17.06	36.09	100.03	104.10	26.07	9.05
			Number priority weeds		7	7	10	8	5	3
			Percentage cover priority weeds		8.02	7.04	95.00	41.05	18.00	5.01
			Total number of species (native and exotic)		25	27	27	25	31	25
			Total percentage vegetation cover (native and exotic)		113.08	97.12	111.05	106.16	121.1	108.15
Groundlayer			Rocks		19	19	0	0.01	0	2
			Litter		0	0.01	0	2	0	0.01
			Bare Ground		0	0.01	0	10	0	0.01
Total Cover (Percentage)					132.08	116.14	111.05	118.17	121.1	110.17

Rocky Escarpment

This quadrat exhibited an apparent general deterioration in indigenous cover over the period of the grant. Much of this may be related to seasonal and cyclic changes related to time since burning. Most notable was a sharp but temporary increase in annual weeds such as Bearded Oat. Percentage of priority weeds has declined slightly, indicating weed control measures for these species may have been preventing their increase; however weed control in the grassland was prioritised in areas that had been more recently burnt where higher efficiency could be attained. This quadrat suggests that improvements in the vegetation quality may require a targeted treatment of annual weeds as these weeds do have the potential to degrade indigenous vegetation in the long term through their effect on hindering establishment of new plants.

October 2012

December 2013

Good Quality

The vegetation here has increased cover of indigenous vegetation, primarily through the thickening of the dominant Kangaroo Grass Sward following ecological burning which had occurred 8 months before the initial survey. A failure to detect the high priority grassy weeds, *Phalaris aquatica* and *Nassella neesiana* in the second survey probably reflects the success of weed control measures under the CfoC grant in this period that would have prioritised control of these priority weeds in post fire conditions.

October 2012

December 2013

Weedy

An ecological burn was conducted in this area during the grant period- targeting areas of the reserve that have been added relatively recently and that retain a high weed load. Reductions in Chilean Needlegrass, Paspalum, Cane Needle Grass and Cocksfoot probably reflect weed control measures for these priority weed species. An overall total reduction in the cover of priority weed from 95% to 41% was recorded. Percentage overall exotic cover managed to increase as exotic low priority weeds, primarily Bearded Oat, filled the spaces left by treatment of the priority weeds. The treated area represents an intermediate stage in vegetation restoration with greater potential for direct seeding to be utilised where the annual weeds are treated.

October 2012

December 2013