FOREST CHECK

PLANTS

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REPORT 1
JULY 2002

INTRODUCTION

The objective of this report is to show outcomes from the first round of monitoring for forest check and to discuss problems with the concept plan for monitoring protocols. Three sites from within the Donnelly District were selected and set up as a monitoring site. Ten grids were set up, three per site and one external control. For vegetation 4 plots each of 1000m^2 and 20 1m^2 were used to record species richness and abundance. A point transect was used on two sides of the 30x30m plots to record vegetation structure and were vertical contacts of shrubs at every 2m intervals for 60m (2 sides). This gave a total of 120 records per grid.

BRIEF: To monitor vascular plant, species richness and abundance for each of the forest check sites

SAMPLING:

The sampling of vegetation in the Forest Check sites were done in accordance with the operations plan. Species richness was done using four 30x30m plots in each grid (40 in total) and species abundance from twenty 1x1m plots (200 in total)(fig 1). 158 species were identified for the 1x1m quadrats and 203 for the 30x30mquadrats and a complete list is attached (appendix 1).

Time estimates were accurate and were based on experience from the Kingston study where similar plots were measured. Time estimates were designed around a two-man team, which from experience is the most efficient method of sampling.

Cost estimates were also based on experience from the Kingston study and resulted in the work being completed within the budget. The next site will need a careful review of the budget required as travel and accommodation costs will need to be considered.

VEGETATION PLOT LAYOUT

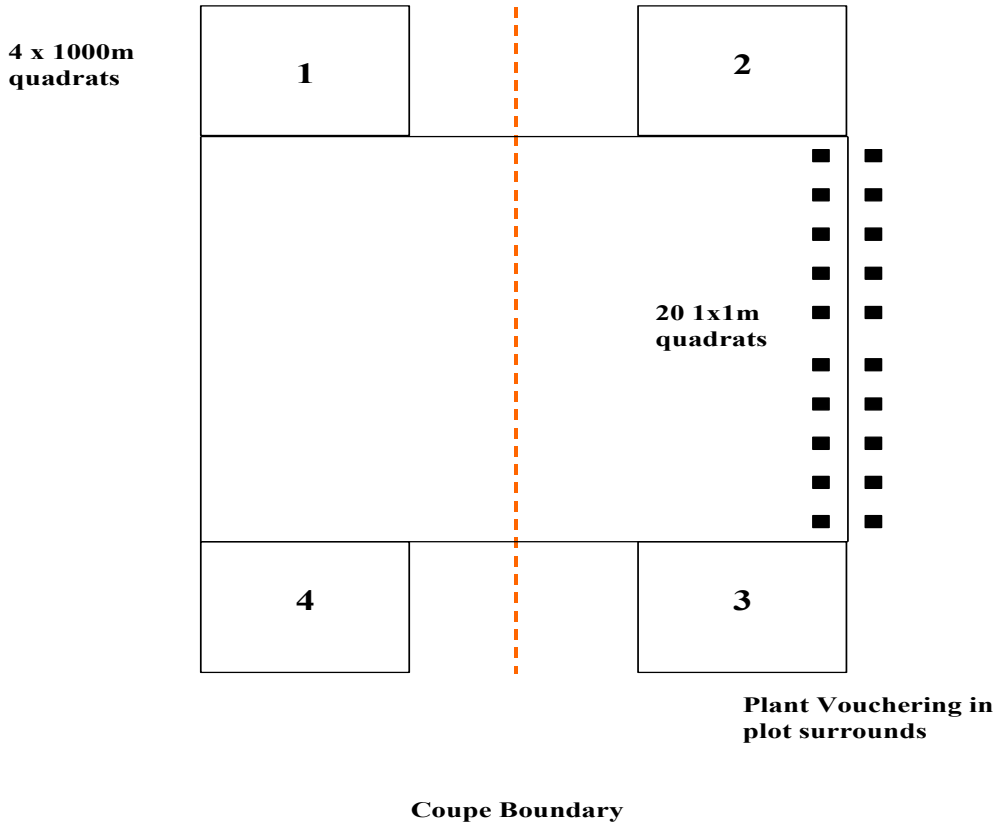


FIGURE 1: Showing plot layout for both 30x30m plot and 1x1m plots.

SAMPLING ISSUES:

Our brief was to monitor plant species abundance and species richness. We recommend that we include in addition to what is already being measured the "Bragg system" of rating cover, distribution and density for all species within the 30x30m plots. This system is quite sensitive and can provide data on all species, which will give a better result. Relying on the 1x1m quadrats for abundance will give an incomplete record, as shown above only 75% of the species were picked up in these quadrats.

"Bragg rating system":

COVER CODE

0 = No plants
1 = < 1% cover
2 = 1 – 5% cover
3 = 5 – 25% cover
4 = 25 – 50% cover
5 = 50 – 75% cover
6 = 75 – 95% cover
7 = 95 – 99% cover
8 = 100% cover

Note: when estimating cover, ignor bare ground and only estimate the percentage of live. Ie what % of the live is covered by the specie being rated.

FREQUENCY CODE

0 = No plant
1 = 1 Plant
2 = < 10 plants
3 = 10 – 50 plants
4 = 50 – 100 plants
5 = > 100 plants

DISTRIBUTION CODE

1	**2**
3	**4**

The plot is divided into 4 quadrants and if plants occur in equivalent to only 1 quadrant then:

1 = ¼
2 = ½
3 = ¾
4 = 1

Canopy cover was measured as a separate task and was done using a point method transect (see forest structure report). As part of the structural measurements for

vegetation a point method system is used and these two tasks can be incorporated into one measurement making this more efficient and cost effective.

Time since fire is an important aspect in plant succession and for monitoring purposes it is necessary to record this. We recommend that a column in the site details be added to record time since last fire.

Some discussion has been made over whether control sites should be burnt and when. For vegetation we recommend that normal tending burning operations should be carried out according to burning schedules and vegetation monitoring planned to be done not less that 2 years following fire. This is so that vegetation has sufficiently recovered to make identification of species possible.

SPECIMEN PROCESSING:

The area around each grid was used to search and voucher flowering plant specimens. In total 128 vouchers were collected which represents about 58% of the species (Appendix 1). This includes a number of duplicates and in successive measurements additional vouchers need to be collected to complete the list.

In the budget estimates, some allocation of funds were for specimen processing, which was mostly materials and data basing. However there is the possibility that the Herbarium may put a charge on each specimen processed. We will need to be aware of this and factor it into future budgets. At present this is still under review and pricing is not yet available.

DATA BASE ESTABLISHMENT

Three data base files have been established to record vegetation data and are called vegbook1, which contains data from the 30x30m plots, vegbook2 has the 1x1m plot data and vegbook3 has levy structural measurements. The data basing of the voucher specimens are contained in the herbarium system under MAX system program. This data is unique and can be retrieved for each site. The voucher specimens which were collected from outside of the 30x30m plots, included an additional 13 species not collected in either of the vegetation plots. The data has all been entered for the Manjimup plots although the data has yet to be retrieved and manipulated.

PRELIMINARY RESULTS

The vegetation database crashed for reasons unknown and data was lost. This caused delays while the data was re-entered and has meant that no data was available to do any preliminary analysis. These problems have now been overcome and all data are entered into the system. From the 4 sites there were 203 species noted from the 30x30m plots and there were 11 species that were not in these plots that were picked up in the 1x1m plots. Where as only 158 species in total were noted from the 1x1m plots, which is 56 fewer

than the 30x30m plots. In addition there were 24 weed species within the 209 total species collected from both series of plots (11.5% of species).

FUTURE TASKS

- The immediate task is to analyse the vegetation data to look at trends
- Prepare and measure the next site for forest check monitoring
- Track any occurrence of priority species that may be present on monitoring sites (none located in current plots)

OPERATING PLAN REVISION

There is no need for any major revision to the operating plan but will include the "Bragg abundance rating system" for the 30x30m plots (see above rating system)

INDICATOR SPECIES

A suggestion to use indicator species as a method of monitoring has been raised and we oppose this for the following reasons:

Biodiversity in terms of species richness, is not shown to be markedly changed in the logging treatments, some variation may be the result of site differences. If only indicator species are used differences may be simply because they aren't there or because of site differences.

Many species occur in low numbers and may or may not be present at any sampling time.

Fire has a large impact on species and species succession and can be affected by time since fire, intensity of the burn or the patchiness. As a result fire frequency and intensity impacts may have more significance on plant abundance and dramatically affect results from an indicator survey.

APPENDIX 1

TOTAL SPECIES LIST 2002 SAMPLING

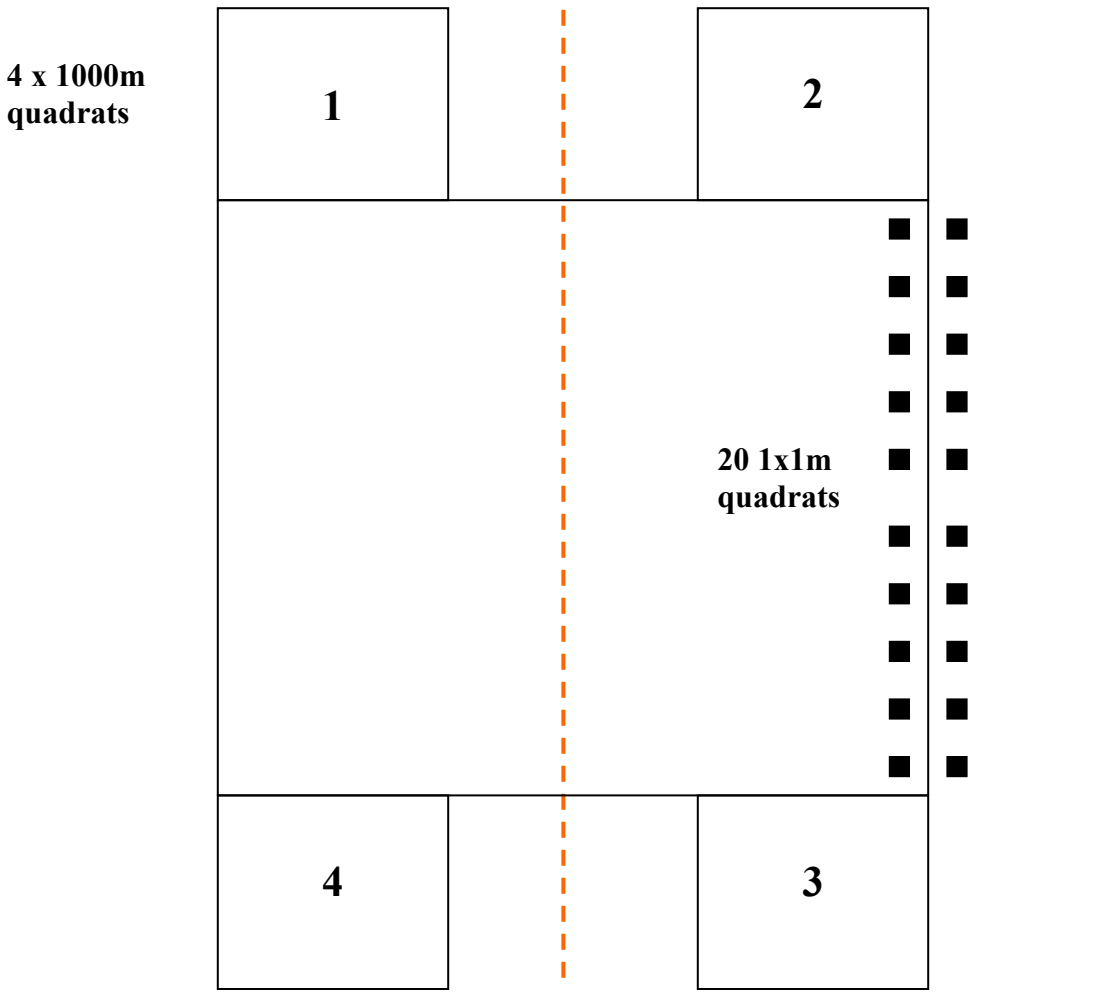
Alien Sp	Taxon Name	Voucher	SpCode	Lifeform	Fire Reponse	Lifestyle
	Acacia alata	V	ACAALA	S	A1	P
	Acacia browniana	V	ACABRO	S	A1	P
	Acacia dentifera		ACADEN	S	A1	P
	Acacia divergens	V	ACADIV	S	A1	P
	Acacia drummondii		ACADRU	S	A1	P
*	Acaena echinata	V	ACAECH	DS	A1	P
	Acacia extensa	V	ACAEXT	S	A1	P
	Acacia myrtifolia		ACAMYR	S	A1	P
	Acacia pulchella	V	ACAPUL	S	A1	P
	Acacia stenoptera	V	ACASTE	S	A1	P
	Adenanthos obovatus		ADEOBO	S	B2	P
	Agonis flexuosa		AGOFLE	T	U	P
	Agonis parviceps	V	AGOPAR	S	B2	P
*	Aira cupaniana	V	AIRCUP	AGR	A1	A
	Amphipogon amphipogonoides		AMPAMP	DS	B2	P
	Amperea ericoides	V	AMPERI	DS	B2	P
*	Anagallis arvensis var. arvensis		ANAARV	AHW	A1	A
*	Anagallis arvensis var. caerulea	V	ANAARV	AHW	A1	A
	Andersonia caerulea	V	ANDCAE	DS	A1	P
	Anigozanthos flavidus		ANIFLA	S	B3	P
*	Arctotheca calendula	V	ARCCAL	AHW	A3	A
	Astroloma ciliatum		ASTCIL	DS	B2	P
	Astroloma drummondii		ASTDRU	DS	B2	P
	Astroloma pallidum	V	ASTPAL	DS	B2	P
	Austrodanthonia caespitosa		AUSCAE	GR	B3	P
	Austrostipa campylachne		AUSCAM	GR	B3	P
	Banksia grandis	V	BANGRA	T	A2	P
	Billardiera floribunda		BILFLO	V	A1	P
	Billardiera variifolia		BILVAR	V	A1	P
	Boronia crenulata		BORCRE	DS	B2	P
	Boronia megastigma		BORMEG	S	A1	P
	Boronia spathulata		BORSPA	S	B2	P
	Bossiaea aquifolium subsp. laidlawiana	V	BOSAQULA	S	A1	P
	Bossiaea linophylla	V	BOSLIN	S	A1	P
	Bossiaea ornata	V	BOSORN	S	B2	P
*	Briza minor	V	BRIMIN	GRW	A1	A
	Burchardia umbellata	V	BURUMB	G	B3	P
	Caesia micrantha	V	CAEMIC	G	B3	P
	Caladenia flava subsp. flava	V	CALFLAF	G	B3	P
	Callistachys lanceolata	V	CALLAN	S	A1	P
	Caladenia macrostylis	V	CALMAC	G	B3	P
	Caladenia reptans subsp. reptans	V	CALREP	G	B3	P
	Caladenia sp.		CALSP.	G	B3	P

Alien Sp	Taxon Name	Voucher	SpCode	Lifeform	Fire Reponse	Lifestyle
	Calytrix simplex	V	CALSIM	S	A1	P
	Cassytha racemosa	V	CASRAC	P	A1	P
	Centrolepis aristata	V	CENARI	H	A1	A
	Centrolepis drummondiana	V	CENDRU	AH	A1	A
*	Centaurium erythraea	V	CENERY	AHW	A1	A
*	Cerastium glomeratum	V	CERGLO	AHW	A1	A
	Chamaescilla corymbosa	V	CHACOR	G	B3	P
	Chorizema nanum	V	CHONAN	DS	A1	P
	Chorizema rhombeum	V	CHORHO	DS	A1	P
	Clematis pubescens	V	CLEPUB	V	A1	P
	Comesperma calymega		COMCAL	DS	B2	P
	Conostylis aculeata		CONACU	DS	B3	P
*	Conyza bonariensis	V	CONBON	AHW	A1	A
	Conospermum capitatum		CONCAP	S	B2	P
	Conostylis setigera		CONSET	DS	B3	P
	Corymbia calophylla		CORCAL	T	A2	P
	Cotula coronopifolia	V	COTCOR	AH	A1	A
	Crassula decumbens	V	CRADEC	AH	A1	A
	Crassula peduncularis		CRAPED	AH	A1	A
	Craspedia variabilis	V	CRAVAR	G	B3	P
*	Crepis foetida		CREFOE	AHW	A1	A
	Cyanicula deformis		CYADEF	G	B3	P
	Cyanicula sericea	V	CYASER	G	B3	P
	Cyrtostylis huegelii	V	CYRHUE	G	B3	P
	Daucus glochidiatus		DAUGLO	AH	A1	A
	Daviesia cordata		DAVCOR	S	U	P
	Daviesia preissii		DAVPRE	S	A1	P
	Desmocladus fasciculatus	V	DESFAS	Z	B3	P
	Desmocladus flexuosus	V	DESFLE	Z	B3	P
	Dodonaea ceratocarpa		DODCER	S	A1	P
	Drosera erythrorhiza		DROERY	G	B3	P
	Drosera huegelii		DROHUE	G	B3	P
	Drosera pallida	V	DROPAL	G	B3	P
	Drosera stolonifera	V	DROSTO	G	B3	P
	Elythranthera brunonis	V	ELYBRU	G	B3	P
*	Erodium cicutarium	V	EROCIC	AHW	A1	A
	Euchiton collinus	V	EUCCOL	AH	A1	A
	Eucalyptus marginata	V	EUCMAR	T	A2	P
*	Galium murale	V	GALMUR	AHW	A1	A
	Gastrolobium bilobum	V	GASBIL	S	A1	P
	Geranium solanderi	V	GERSOL	DS	A1	A
	Gompholobium marginatum	V	GOMMA	DS	A1	P
	Gompholobium ovatum	V	GOMOVA	DS	A1	P
	Gompholobium polymorphum		GOMPOL	DS	A1	P
	Gompholobium tomentosum		GOMTOM	DS	A1	P
	Gonocarpus benthamii		GONBEN	DS	A1	P
	Goodenia eatoniana		GOOEAT	DS	A1	A
	Hakea amplexicaulis	V	HAKAMP	S	B2	P
	Hakea lissocarpha		HAKLIS	S	B2	P
	Hakea oleifolia	V	HAKOLE	S	B2	P

Alien Sp	Taxon Name	Voucher	SpCode	Lifeform	Fire Reponse	Lifestyle
	Hardenbergia comptoniana	V	HARCOM	V	B2	P
	Hemigenia rigida		HEMRIG	DS	B2	P
	Hibbertia amplexicaulis	V	HIBAMP	S	B2	P
	Hibbertia commutata	V	HIBCOM	S	B2	P
	Hibbertia cuneiformis		HIBCUN	S	B2	P
	Hibbertia racemosa	V	HIBRAC	S	A1	P
	Hibbertia spicata		HIBSPI	S	B2	P
	Hibbertia spicata		HIBSPI	S	B2	P
	Hovea chorizemifolia	V	HOVCHO	DS	B2	P
	Hovea elliptica	V	HOVELL	S	B2	P
	Hyalosperma cotula	V	HYACOT	AH	A1	A
	Hybanthus debilissimus	V	HYBDEB	DS	A1	P
	Hydrocotyle callicarpa	V	HYDCAL	AH	A1	A
	Hydrocotyle diantha		HYDDIA	AH	A1	A
	Hydrocotyle diantha		HYDSP.	AH	A1	A
	Hypocalymma angustifolium	V	HYPANG	S	B2	P
*	Hypochaeris glabra	V	HYPGLA	AHW	A1	A
	Isotropis cuneifolia	V	ISOCUN	S	A1	P
	Isotoma hypocrateriformis		ISOHYP	AH	A1	A
*	Isolepis marginata	V	ISOMAR	AR	A1	A
	Johnsonia lupulina		JOHLUP	G	B2	P
*	Juncus capitatus	V	JUNCAP	AW	A1	A
	Kennedia carinata	V	KENCAR	DS	A1	P
	Kennedia coccinea	V	KENCOC	V	A1	P
	kennedia prostrata	V	KENPRO	S	A1	P
	Labichia punctata	V	LABPUN	DS	B2	P
	Lagenophora huegelii	V	LAGHUE	G	B3	P
	Leptomeria cunninghamii		LEPCUN	S	A1	P
	Lepidosperma leptostachyum		LEPLEP	Z	B3	P
	Lepidosperma squamatum	V	LEPSQU	Z	B3	P
	Leucopogon australis	V	LEUAUS	S	B2	P
	Leucopogon capitellatus	V	LEUCAP	S	B2	P
	Leucopogon propinquus	V	LEUPRO	S	B2	P
	Leucopogon pulchellus		LEUPUL	S	B2	P
	Leucopogon verticillatus	V	LEUVER	S	B2	P
	Levenhookia pusilla	V	LEVPUS	AH	A1	A
	Lindsaea linearis		LINLIN	F	B3	P
	Logania serpyllifolia	V	LOGSER	DS	B2	P
	Logania vaginalis	V	LOGVAG	S	B2	P
	Lomandra caespitosa	V	LOMCAE	DS	B3	P
	Lomandra drummondii		LOMDRU	DS	B3	P
	Lomandra hermaphrodita	V	LOMHER	DS	B2	P
	Lomandra integra	V	LOMINT	DS	B3	P
	Lomandra pauciflora		LOMPAU	DS	B2	P
	Lomandra purpurea		LOMPUR	DS	B3	P
	Lomandra sericea		LOMSER	DS	B3	P
*	Lotus suaveolens		LOTSUA	AHW	A1	A
	Luzula meridionalis	V	LUZMER	R	B3	P
	Macrozamia riedlei	V	MACRIE	C	B3	P
	Microlaena stipoides	V	MICSTI	GR	A1	P

Alien Sp	Taxon Name	Voucher	SpCode	Lifeform	Fire Reponse	Lifestyle
	Millotia tenuifolia	V	MILTEN	AH	A1	A
	Myoporum tetrandrum	V	MYOTET	S	A1	P
	Oligochaetochilus vittatus		OLIVIT	G	B3	P
	Opercularia hispidula	V	OPEHIS	S	B2	P
	Orthrosanthus laxus	V	ORTLAX	G	B3	P
*	Oxalis corniculata	V	OXACOR	G	B3	P
	Ozothamnus ramosus		OZORAM	S	U	P
*	Parentucellia latifolia	V	PARLAT	AHW	A1	A
	Patersonia babianoides	V	PATBAB	G	B3	P
	Patersonia occidentalis		PATOCC	DS	B3	P
	Patersonia umbrosa		PATUMB	DS	B3	P
	Patersonia umbrosa var. xanthina	V	PATUMB	DS	B3	P
	Pelargonium littorale	V	PELLIT	DS	A1	P
	Pentapeltis silvatica	V	PENSIL	S	B2	P
	Persoonia longifolia	V	PERLON	S	B2	P
	Phyllanthus calycinus	V	PHYCAL	DS	B2	P
	Phyllangium paradoxum		PHYPAR	AH	A1	A
	Pimelea angustifolia		PIMANG	S	A1	P
	Pimelea ciliata	V	PIMCIL	S	A1	P
	Pimelea rosea	V	PIMROS	S	A1	P
	Pimelea suaveolens		PIMSUA	S	B2	P
	Platytheca galioides	V	PLAGAL	S	U	A
	Platysace tenuissima	V	PLATEN	DS	A1	P
*	Poa annua		POAANN	AGR	A1	A
	Podocarpus drouynianus	V	PODDRO	S	B2	P
	Podotheca gnaphalioides		PODGNA	AH	A1	A
	Poranthera huegelii	V	PORHUE	DS	A1	P
	Poranthera microphylla	V	PORMIC	DS	A1	A
*	Pseudognaphalium luteoalbum		PSELUT	AHW	A1	A
	Pteridium esculentum	V	PTEESC	F	B2	P
	Pterostylis pyramidalis	V	PTEPYR	G	B3	P
	Pterostylis recurva		PTEREC	G	B3	P
	Ptilotus manglesii		PTIMAN	G	B3	P
	Ranunculus colonorum	V	RANCOL	G	B3	P
	Rhodanthe citrina	V	RHOCIT	AH	A1	A
	Scaevola striata		SCASTR	DS	A1	A
	Senecio hispidulus	V	SENHIS	S	A1	A
*	Silene gallica		SILGAL	AHW	A1	A
	Sollya heterophylla	V	SOLHET	S	U	P
*	Sonchus asper	V	SONASP	AHW	A1	A
	Sowerbaea laxiflora	V	SOWLAX	G	B3	P
	Sphenotoma capitatum	V	SPHCAP	DS	A1	P
	Sphaerolobium medium	V	SPHMED	S	B2	P
	Stackhousia monogyna	V	STAMON	S	B2	P
	Stylidium amoenum		STYAMO	DS	A1	P
	Stylidium brunonianum		STYBRU	DS	A1	P
	Stylidium calcaratum	V	STYCAL	AH	A1	A
	Stylidium ciliatum		STYCIL	DS	A1	P
	Stylidium luteum		STYLUT	DS	A1	P
	Stylidium rhynchocarpum		STYRHY	DS	A1	P

Alien Sp	Taxon Name	Voucher	SpCode	Lifeform	Fire Reponse	Lifestyle
	Styphelia tenuiflora		STYTEN	S	A1	P
	Tetratheca affinis	V	TETAFF	S	A1	P
	Tetraria capillaris		TETCAP	S	B3	P
	Tetratheca hirsuta		TETHIR	S	A1	P
	Tetratheca hispidissima	V	TETHIS	S	A1	P
	Tetrarrhena laevis		TETLAE	GR	B3	P
	Thelymitra crinita		THECRI	G	B3	P
	Thysanotus manglesianus	V	THYMAN	G	B3	P
	Thysanotus sp.	V	THYSP.	G	B3	P
	Thysanotus thyrsoideus		THYTHY	G	B3	P
	Trachymene pilosa	V	TRAPIL	AH	A1	A
	Tremandra diffusa	V	TREDIF	S	A1	P
	Tremandra stelligera		TRESTE	DS	B2	P
*	Trifolium campestre		TRICAM	AH	A1	A
	Tricoryne humilis		TRIHUM	DS	A1	P
	Trichocline spathulata		TRISPA	G	B3	P
	Trymalium floribundum	V	TRYFLO	S	A1	P
	Trymalium ledifolium		TRYLED	S	A1	P
*	Vellereophyton dealbatum	V	VELDEA	AHW	A1	A
	Velleia trinervis	V	VELTRI	DS	A1	A
	Veronica calycina		VERCAL	DS	B3	P
*	Vulpia myuros		VULMYU	AGRW	A1	A
	Wahlenbergia gracilenta	V	WAHGRA	AH	A1	A
	Xanthosia atkinsoniana	V	XANATK	S	B2	P
	Xanthosia candida	V	XANCAN	DS	B2	P
	Xanthorrhoea gracilis		XANGRA	X	B2	P
	Xanthosia huegelii	V	XANHUE	DS	A1	P
	Xanthorrhoea preissii		XANPRE	X	B2	P


4 x 1000m quadrats
1
2
20 1x1m quadrats
4
3
Plant Vouchering in plot surrounds
Coupe Boundary