

Vegetation Assessment

Stony Creek Addition to Eusdale Nature Reserve

For OEH-NPWS



MJADWESCH

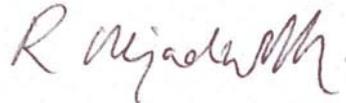
ENVIRONMENTAL

SERVICE SUPPORT

This *Vegetation Assessment* has been prepared by Raymond Mjadwesch (Mjadwesch Environmental Service Support). Fieldwork was conducted under Scientific Investigation Licence No. S10203 in accordance with vegetation survey standards (Walker and Hopkins 1990 and National Herbarium guidelines).

The information contained herein is complete and correct to the best of my knowledge. I accept full responsibility for any errors or omissions however this document has been prepared in good faith and on the basis that neither MESS nor its personnel are liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which may occur in respect of the taking (or not taking) any advice herein.

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Cover: *The Eusdale Addition is dominated by the Stony Creek valley*

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Section 1 – Introduction

1.1 Background

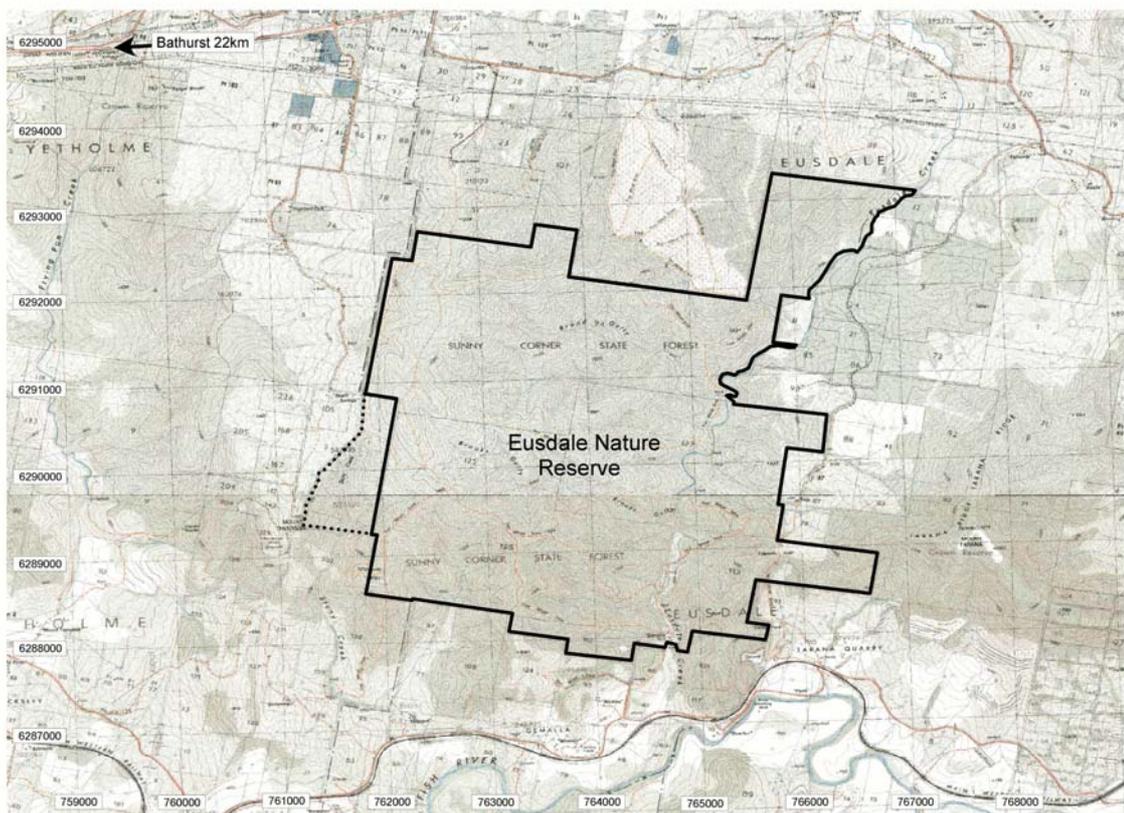
In 2004 management of Eusdale Nature Reserve (formerly part of Sunny Corner State Forest – colloquially “Frappels Block”) was transferred from State Forest NSW to DECC (now OEH). OEH have produced a vegetation layer of the Reserve (2009), however this is based on boundaries which did not include the Addition (the area subject to this study).

This report has been commissioned to complete the vegetation layer for the Reserve, by mapping the distribution of dominant vegetation communities across the addition, describing these communities, and correlating them to Keith (2004).

1.2 Location

Eusdale Nature Reserve is located approximately 22kms east of Bathurst in the Central Tablelands of NSW, (see Figure 1).

Figure 1. Eusdale Nature Reserve



Source: Topoview
1:25 000 Topographic Map Series

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Scale

1km

1.3 Scope

This vegetation assessment report:

- Maps distribution of vegetation communities across the addition, based on dominance of species in the canopy
- Describes vegetation communities across the addition
- Updates nomenclature so that OEH can update the vegetation layer across the entire Reserve according to Keith (2004) and
- Provides recommendations for further assessment, monitoring and management.

This report applies only to the land for which it was prepared (Eusdale Nature Reserve), and is not to be used in other planning or development situations.

2.1 Planning

The vegetation layer for Eusdale Nature Reserve was produced (DECC 2009), and this and a map of the addition provided for production of a topographical map, on which to record distribution of dominant canopy species, on which to base vegetation communities (Figure 7).

Once community mapping was complete, this allowed identification of an appropriate number and suitable locations for quadrats, to sample vegetation communities systematically. Survey was conducted in winter, simply due to time constraints in conducting surveys across the 2009-2010 spring and summer periods.

2.2 Fieldwork

Fieldwork was conducted on the 16th & 18th June 2009 (vegetation mapping) and the 29th July 2011 (quadrat based sampling).

Vegetation mapping was done by walking transects corresponding to boundaries of dominant canopy species and GPS'ing these boundaries, or transcribing directly to the site map dominant species and their distribution based on field observations.

Quadrats were systematically inspected in the Dry Grassy Forest unit (which was not sampled during the simultaneously running Mount Horrible Vegetation Assessment - Mjadwesch 2011)) and in a grassy Yellow Box unit (to demonstrate presence of the Box-Gum endangered ecological community, which occurs widely in the region) within the Eusdale Nature Reserve.

Quadrats were photographed (see Appendix 1), vegetation was described according to OEH-BCU Flora Modules (1, 4 and 5), and quadrats were surveyed according to National Herbarium standards in vegetation survey (20x20m nested quadrats). Data sheets are attached in Appendix 1, quadrat locations are indicated on Figure 7.

Additional observations of the characteristics of the study area were made opportunistically during the time in the field.

2.3 Analysis

Plants were identified according to the *Flora of NSW* (Harden Ed, 1992-2002). Vegetation communities were identified by reference to a vegetation layer produced by NPWS (2009) and correlating these to Keith (2004). The condition of vegetation was determined by considering particularly the composition, distribution and dominance of the exotic flora.

The vegetation map was produced by inspecting distribution of communities across the range of landforms occurring in the addition, and extrapolating these according to contours / altitude and aspects across the study area, and air photo and photo interpretation.

3.1 Site Description

Eusdale Nature Reserve is a series of high hills and deep valleys associated with the Great Dividing Range east of Bathurst in NSW, in the Central Tablelands (botanical division), which occupies the much of the northern reaches of Australia's South-east Highlands bioclimatic region (according to Thackway & Cresswell 1996).

The Eusdale addition is an extension to the western edge of the nature reserve, including the eastern slopes of Mount Tennyson and the associated Stony Creek watershed, which here forms a steep-sided valley opening to the south (discharging to the Fish River, in the Upper Macquarie subcatchment of the Central West Catchment Management Area).

3.2 Vegetation Communities

Vegetation communities within the study area have been mapped by NPWS (2009), based primarily on the distribution of dominant species in the canopy. Units identified within the study area (the addition) have been allocated to corresponding Vegetation Types according to Keith (2004).

Eusdale Stony Creek Additions – Vegetation Units

NPWS (2009)	Keith (2004)
Cleared Land	Not mapped in addition
<i>E. dalrympleana</i> / <i>E. dives</i>	Southern Tableland Dry Sclerophyll Forest
<i>E. dalrympleana</i> / <i>E. pauciflora</i>	Subalpine Woodland
<i>E. dives</i> / <i>E. dalrympleana</i>	Southern Tableland Dry Sclerophyll Forest
<i>E. fastigata</i>	Not mapped in addition
<i>E. maculosa</i> / <i>E. rossii</i>	Southern Tableland Dry Sclerophyll Forest
<i>E. melliodora</i> / <i>E. bridgesiana</i>	Western Slopes Grassy Woodland
<i>E. viminalis</i> (basal 75-100%)	Southern Tableland Wet Sclerophyll Forest
<i>E. viminalis</i> (basal <75%)	Southern Tableland Wet Sclerophyll Forest

The Southern Tableland Dry Sclerophyll Forests have been further differentiated here, into Dry Grassy Forest and Ridgetop Woodland, to correspond to assemblages described in the report on vegetation in the Mount Horrible addition to Winburndale Nature Reserve (Mjadwesch 2011).

1. Snow Gum Sub-Alpine Woodland

NPWS (2009) units mapped as *Eucalyptus dalrympleana* – *Eucalyptus pauciflora* occur on the high ranges in the north-west of Eusdale Nature Reserve; Snow Gum (*E. pauciflora*) characterises Keiths Subalpine Woodlands (2004).

Canopy strata is dominated by Snow Gums (*E. pauciflora*) with occasionally Mountain Gum (*E. dalrympleana*), the shrub layer is largely absent, groundcover is dominated by Bracken Fern (*Pteridium esculentum*), with also Spiny-headed Mat-rush (*Lomandra longifolia*) and Snow Grass (*Poa sieberiana sieberiana*); Prickly Starwort (*Stellaria pungens*) and Pennywort (*Hydrocotyle laxiflora*) are also common in the groundcover.



Figure 2. Snow Gums occur on the highest ridge

2. Southern Tableland Dry Sclerophyll Forest

Upper slopes are occupied by dry sclerophyll forests – two formations dominate this situation.

2a. Ridgetop Woodland

Spotted Gum (*E. mannifera*) occurs on what appear to be more skeletal (rockier) soils on midslopes and drier (northerly and westerly) aspects. , sometimes with Broad-leaved Peppermint, sometimes with Long-leaved Box (*E. goniocalyx*), and with an occasional Scribbly Gum (*E. rossii*).

Shrubbery is sparse, however Blackthorn occurs as individual plants and in stands. Groundcover is often grassy with Red-andthered Wallaby Grass, however sections of the groundcover can be dominated by Spiny-headed Mat-rush (*L. longifolia*), Snow Grass (*P. sieberiana*).



Figure 3. *Spotted Gum* occurs on shallower soil, on steeper and drier slopes

2b. Dry Grassy Forest

Stands of Broad-leaved Peppermint (*E. dives*) occur within the study area, often with Mountain Gum (*E. dalrympleana*) – either of these species may be locally dominant, or they may occur in combination – the unifying character of this unit is the grassy nature of the groundcover.

Silver Wattle (*Acacia dealbata*) and Blackwood (*A. melanoxylon*) for a secondary canopy component; shrubbery includes Narrow-leaved Geebung (*Persoonia linearis*), Guinea Flower (*Hibbertia obtusifolia*), Blackthorn (*Bursaria spinosa*) and Egg & Bacon Pea (*Daviesia latifolia*).

Groundcover is mostly grassy with Red-anthered Wallaby Grass (*Joycea pallida*), Snow Grass (*P. sieberiana*) and Wattle Mat-rush (*L. filiformis*), however it can be diverse, with Kangaroo Grass (*Themeda australis*), Spiny-headed and Wattle Mat-rush (*L. longifolia* and *L. filiformis*), Bracken Fern (*P. esculentum*), Prickly Starwort (*Stellaria pungens*), Star Cudweed (*Gnaphalium sphaericum*) and Native Violet (*Viola hederacea*).



Figure 4. *Broad-leaved Peppermint* occurs sometimes in monotypic stands

These units correspond with the NPWS (2009) *Eucalyptus dives* – *Eucalyptus dalrympleana* associations, in a dry grassy formation of the Southern Tablelands Dry Sclerophyll Forest type (according to Keith 2004). This is a dominant community on upper slopes in the western half of the Reserve.

3. Southern Tableland Wet Sclerophyll Forest

Ribbon Gum (*E. viminalis*) is a tall forest tree which occurs in moist gully and riparian environments, and on slopes and ranges with deeper soils. Within this unit the dominant association is Ribbon Gum (*E. viminalis*) / Blackwood (*A. melanoxylon*).

Shrubbery can be common, including Tree Violet (*Hymenanthera dentata*), Blackthorn, River Lomatia (*Lomatia myricoides*) and Sifton Bush (*Cassinia arcuata*). Blackberry (*Rubus fruticosus*) also occurs in patches. Groundcover within this unit is very diverse, including many grass and herb species; nettles (*Urtica incisa*) were very common.



Figure 5. Moist gullies are dominated by Ribbon Gum; Blackwood is also common

4. Western Slopes Grassy Woodland

The southern boundary of the addition is dominated by Apple Box (*E. bridgesiana*), Yellow Box (*E. melliodora*) is sparsely scattered throughout, lower down the slope and the Stony Creek drainage line includes Ribbon Gum (*E. viminalis*). Blackwood (*A. melanoxylon*) and Silver Wattle (*A. dealbata*) form a secondary canopy.

Shrubs are rare, however a shrub layer can include Sifton Bush (*Cassinia arcuata*), Blackthorn (*B. spinosa*) and Peach Heath (*Lissanthe strigosa*).

Groundcover is very diverse, including many grasses such as Wallaby Grasses (*Austrodanthonia* spp) and Weeping Meadow Grass (*Microlaena stipoides*), as well as Tussock (*P. sieberiana*) and Spiny-headed Mat-rush (*L. longifolia*), and herbs such as .



Figure 6. *Apple Box* is a characteristic of many drainage lines in the region – in the south of the addition, it occurs with *Yellow Box*

This unit corresponds to the Box-Gum endangered ecological community (listed under the NSW *Threatened Species Conservation Act 1995* and the federal *Environment Protection & Biodiversity Conservation Act 1999*), which is mapped by DECC as *Eucalyptus melliodora* – *Eucalyptus bridgesiana*, being mapped in the eastern portions of the reserve.

The distribution of vegetation units is illustrated on the following page (Overlay 1).

Overlay 1. Vegetation Communities

Key (Keith 2004)

-  1. Subalpine Woodland (*E. pauciflora*)
- 2. Southern Tablelands Dry Sclerophyll Forest
 -  2a. Ridgetop Woodland (*E. rossii* / *E. mannifera*)
 -  2b. Dry Grassy Woodland (*E. dives* / *E. dalrympleana*)
-  3. Southern Tableland Wet Sclerophyll Forest (*E. viminalis* / *A. melanoxylon*)
-  4. Western Slopes Grassy Woodland (*E. bridgesiana*)

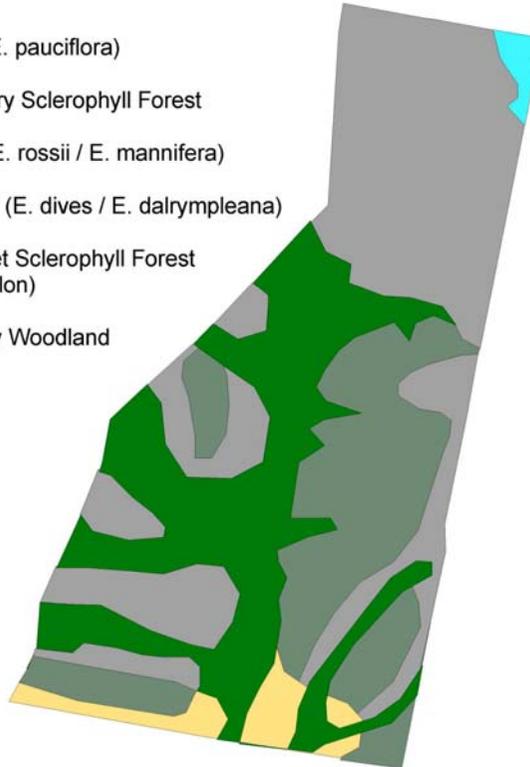
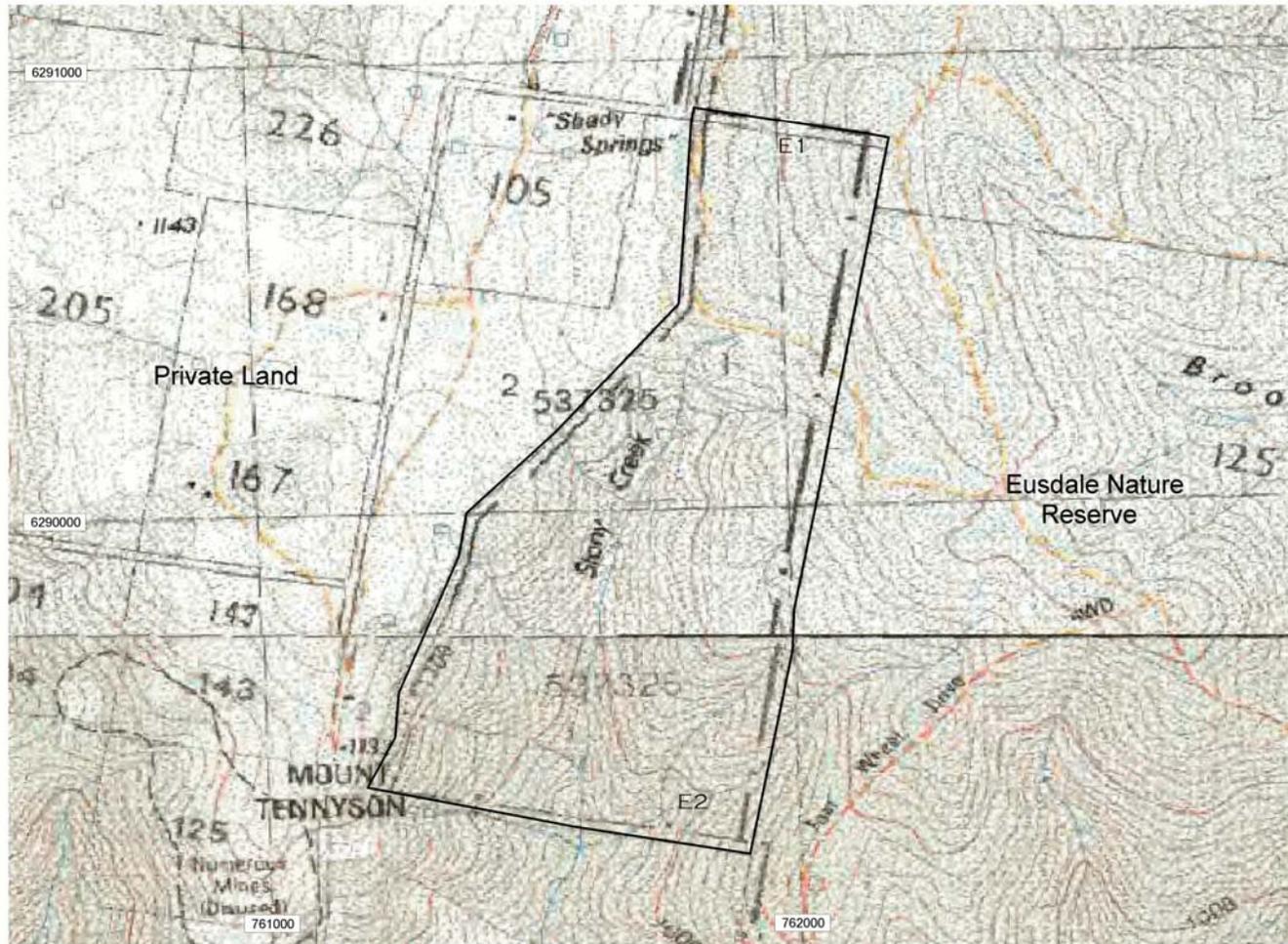


Figure 7. Eusdale Nature Reserve: Stony Creek Addition



Source: Topoview
1:25 000 Topographic Map Series

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3.3 The Flora of Eusdale Nature Reserve

A total of 89 plant taxa have been identified during this assessment (Table 1), including 17 introduced species. Eucalypts (the MYRTACEAE), as in forests across Australia, dominate the canopy, often with acacias (FABACEAE-MIMOSOIDEAE). Grasses (POACEAE) are a dominant family, otherwise the daisies (ASTERACEAE) are well represented, as are the peas and legumes (FABACEAE-FABOIDEAE).

Table 1. Flora of Eusdale Nature Reserve – Stony Creek Addition

FAMILY		E1	E2	Opp
Genus species	Common Name / Notes (ID)			
SINOPTERIDACEAE				
<i>Cheilanthes sieberi sieberi</i>	Rock Fern		x	x
DENNSTAEDTIACEAE				
<i>Pteridium esculentum</i>	Bracken Fern	x		x
ASPLENIACEAE				
<i>Asplenium flabellifolium</i>	Necklace Fern		x	x
RANUNCULACEAE				
<i>Ranunculus lappaceus</i>			x	
<i>Clematis glycinoides</i>	Headache Vine		x	
CARYOPHYLLACEAE				
* <i>Petrorhagia nantueuillii</i>	Proliferous Pink		x	
* <i>Stellaria media</i>	Chickweed		x	
<i>Stellaria pungens</i>	Prickly Starwort		x	x
POLYGONACEAE				
* <i>Acetosella vulgare</i>	Sheep Sorrel		x	
DILLENIACEAE				
<i>Hibbertia obtusifolia</i>	Guinea Flower	x	x	x
URTICACEAE				
<i>Urtica incisa</i>	Stinging Nettle			x
THYMELEACEAE				
<i>Pimelea curviflora v. curviflora</i>		46		
EUPHORBIACEAE				
<i>Poranthera microphylla</i>		x		
VIOLACEAE				
<i>Viola hederacea</i>	Ivy-leaved Violet			x
<i>Hymenanchera dentata</i>	Tree Violet		x	x
PRIMULACEAE				
* <i>Anagallis arvensis</i>	Scarlet Pimpernel		x	
CRASSULACEAE				
<i>Crassula sieberiana</i>	Stonecrop		x	

FAMILY	Genus species	Common Name / Notes (ID)	E1	E2	Opp
ROSACEAE					
	** <i>Rubus fruticosus</i>	Blackberry			x
	<i>Acaena novaeseelandiae</i>	Bidgee-widgee			x
	<i>Acaena agnipila</i>			48	
PROTEACEAE					
	<i>Persoonia linearis</i>	Narrow-leafed Geebung	x		x
	<i>Lomatia myricoides</i>	River Lomatia			x
MYRTACEAE					
	<i>Eucalyptus bridgesiana</i>	Apple Box		x	x
	<i>Eucalyptus dalrympleana</i>	Mountain Gum	x		x
	<i>Eucalyptus dives</i>	Broad-leafed Peppermint	x		x
	<i>Eucalyptus goniocalyx</i>	Long-leafed Box			x
	<i>Eucalyptus mannifera</i>	Spotted Gum			x
	<i>Eucalyptus melliodora</i>	Yellow Box		x	x
	<i>Eucalyptus pauciflora</i>	Snow Gum			x
	<i>Eucalyptus rossii</i>	Inland Scribbly Gum			x
	<i>Eucalyptus viminalis</i>	Ribbon Gum			x
HALORAGACEAE					
	<i>Gonocarpus tetragynus</i>		x		
FABACEAE/MIMOSOIDEAE					
	<i>Acacia dealbata</i>	Silver Wattle			x
	<i>Acacia melanoxylon</i>	Black Wattle		x	x
	<i>Acacia obliquinervia</i>	Mountain Hickory			x
	<i>Acacia gunnii</i>	Ploughshare Wattle	x		
FABACEAE/FABOIDEAE					
	<i>Gompholobium huegelii</i>	Pale Wedge Pea	x		
	<i>Platylobium formosum</i>		x		x
	<i>Daviesia latefolia</i>	Bacon & Egg Pea	x		x
	<i>Daviesia leptophylla</i>	Bacon & Egg Pea	x		
	<i>Hardenbergia violacea</i>	False Sarsaparilla	x		x
	<i>Hovea linearis</i>		x		
OXALIDACEAE					
	<i>Oxalis perennans</i>	Soursob		x	



Persoonia linearis



Brachyscome spathulata & Luzula flaccida



Senecio diaschides

FAMILY	Genus species	Common Name / Notes (ID)	E1	E2	Opp
PITTOSPORACEAE	<i>Bursaria spinosa</i>	Blackthorn		x	x
ARALIACEAE	* <i>Hedera helix</i>	English Ivy			x
APIACEAE	<i>Hydrocotyle laxiflora</i>	Stinking Pennywort		x	x
ASTERACEAE	* <i>Conyza bonariensis</i>	Flaxleaf Fleabane		x	
	<i>Brachyscome spathulata</i>		x		
	<i>Helichrysum scorpioides</i>			x	
	<i>Cassinia arcuata</i>	Sifton Bush	47	x	x
	<i>Gnaphalium sphaericum</i>	Cudweed			x
	<i>Gnaphalium involucratum</i>	Star Cudweed		x	
	<i>Senecio quadridentatus</i>	Cotton Fireweed			x
	<i>Senecio tenuiflorus</i>			x	
	<i>Senecio diaschides</i>		x		
	<i>Senecio Species E</i>			x	
	<i>Senecio sp.</i>				x
	<i>Cymbonotus lawsonianus</i>	Bears Ear		x	x
	* <i>Sonchus oleraceus</i>	Milk Thistle		x	
	* <i>Cirsium vulgare</i>	Spear Thistle		x	x
	* <i>Silybum marianum</i>	Variegated Thistle		x	
	* <i>Hypochaeris radicata</i>	Catsear	x		
	* <i>Hypochaeris glabra</i>	Smooth Catsear		x	
	* <i>Chondrilla juncea</i>	Skeleton Weed		x	
BORAGINACEAE	<i>Cynoglossum australe</i>			x	
	* <i>Echium vulgare</i>	Vipers Bugloss		x	
EPACRIDACEAE	<i>Lissanthe strigosa</i>	Peach Heath	x		
	<i>Styphelia triflora</i>	Pink Fivecorners		x	
STYLIDIACEAE	<i>Stylidium graminifolium</i>	Grass Trigger Plant	x		
RUBIACEAE	<i>Galium propinquum</i>			x	
GENTIANACEAE	* <i>Centaurium erythraea</i>	Common Centaury		x	
SCROPHULARIACEAE	<i>Veronia plebeia</i>	Trailing Speedwell		x	x
PLANTAGINACEAE	<i>Plantago debilis</i>			x	

FAMILY		E1	E2	Opp
Genus species	Common Name / Notes (ID)			
LOMANDRACEAE				
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush		x	x
<i>Lomandra filiformis filiformis</i>	Wattle Mat-rush	x		x
PHORMIACEAE				
<i>Dianella revoluta</i>	Blue Flax-lily	x		
IRIDACEAE				
<i>Patersonia sericea</i>			x	
JUNCACEAE				
<i>Luzula flaccida</i>		x	x	
CYPERACEAE				
<i>Carex appressa</i>				x
POACEAE				
<i>Themeda australis</i>	Kangaroo Grass			x
<i>Entolasia stricta</i>		x		
<i>Echinopogon ovatus</i>	Forest Hedgehog Grass		x	
<i>Austrodanthonia racemosa</i>	Wallaby Grass		x	
<i>Joycea pallida</i>	Red-anthered Wallaby Grass		x	x
* <i>Cynosurus echinatus</i>	Rough Dogs Tail			x
<i>Poa labillardieri</i>	Tussock			x
<i>Poa sieberiana sieberiana</i>	Tussock Grass	x	x	x
** <i>Nasella trichotoma</i>	Serrated Tussock			x
<i>Austrostipa rudis nervosa</i>	Spear Grass		x	
<i>Microlaena stipoides</i>	Weeping Meadow Grass		x	

Table 1 is arranged taxonomically as in Harden (Ed) 1992-2002. * indicates introduced species: ** indicates noxious species (as listed under the *Noxious Weeds Act 1993*).

4.1 Limitations

Conducting the assessment in June (winter) provided that many species were much depleted (seeds dropped / plants withered) and identifications of many seasonally occurring species which occur there (such as the orchids, for example) were not possible. The species list will remain indicative, as seasonal or climatic conditions and successional progression provides opportunities for many additional species to occur across the addition, and across the reserve.

4.2 The Addition - Vegetation

In a general sense the forests of the addition are “young”; trees are rarely into advanced maturity, which is characterised in eucalypts by development of hollows, and great size in species such as Mountain and Ribbon Gum. Large mature trees (Mountain Gums) were only found during the assessment within the pre-existing Eusdale Nature Reserve boundary (nearing the south-east border of the addition). The lack of large trees may be a result of past mining activity which occurred locally; mining adits were observed near the western boundary of the addition (“M” in Overlay 1), these sort of activities and log taking generally will have accounted for many of the large trees which occurred historically.

Despite the immaturity of the forest (few hollows), the Addition provides important habitat for a range of species, pure stands of Blackwood for example provide an alternative flowering period to eucalypts, which is important for many species of birds, and gliding possums (remains of a Sugar Glider were found on the ground within a stand of Blackwood) – these in turn provide resources for species such as the Powerful Owl, which is known to persist within the Eusdale and Winburndale Nature Reserves.

Significant within the addition is the Yellow Box / Apple Box unit in the south, which corresponds to the endangered Box-Gum ecological community.

Otherwise sub-alpine (Snow Gum) woodlands are restricted regionally to the high ranges of the Great Dividing Range, occurring in patches within Eusdale Nature Reserve and north to beyond Winburndale Nature Reserve, as well as in isolated and fragmented units around Yetholme and Mount Lambie, to Rydal and Hampton, and Jenolan and Oberon in the south. Mount Canobolas is an outlying unit of this sub-alpine vegetation c. 50km to the west.

Overall the Stony Creek addition has high conservation value in terms of its flora, including an area (c. 40ha) of the endangered (Box-Gum) ecological community, being intact (ie: diverse) and in good condition (ie: few weeds). While weeds occur, native flora is dominant throughout the area inspected; weeds which occur in any degree of abundance are limited to Blackberry and Serrated Tussock, and these species at the time of writing were of limited distribution.

5.1 Conclusion

The conservation / natural vegetation values of Eusdale Nature Reserve are high in a landscape where locally the ranges remain wooded, but valleys are extensively cleared / modified by agriculture and residential development. The Addition provides an important adjunct to the forests of Eusdale Nature Reserve; as it matures it will become even more important as habitat for not only plants of the ranges, but also fauna, including threatened species such as the Powerful Owl and Gang-gang Cockatoo.

A good (diverse, few weeds) example of the endangered Box-Gum grassy woodland community occurs in the lower reaches of the Stony Creek valley. Controlling weeds will be the main requirement for management, to maintain and improve vegetation values. This and other strategies for improving knowledge of the reserves' vegetation, and broader conservation management activities are discussed in the recommendations following.

5.2 Recommendations

- Further vegetation assessment.

Scope of systematic survey was limited to two (2) quadrats when initially considering a vegetation assessment; the number of communities mapped during assessment give grounds for further assessment to include additional quadrats (two of) in each of the communities identified.

Setting up permanent vegetation quadrats would provide for monitoring of changes in species composition, following programs such as hazard reductions. Quadrats established at the site should include measures of cover / abundance, a period between surveys of between 5 and 10 years would be reasonable.

- Fire Management

In 2009 during initial assessments of the study area, the area bounded by the northern boundary of the addition and the maintenance / fire trail which bisects the addition had been burnt (Figure 8).

Quadrat E1 was surveyed within this burnt unit in 2011, 2 years after this prescribed fire. Vegetation was healthy and maturing within the quadrat at this time.

Studies on fire ecology, for example quadrat based vegetation descriptions and monitoring, can provide important information on fire responses of various vegetation communities.



Figure 8. A hazard reduction had been applied to the Mountain Gum forest in 2009

- Weed invasion is the primary process which needs to be addressed at the site in terms of maintaining or improving native vegetation values.

Infestations of Blackberry (*R. fruticosus*) across the Reserve should be treated; Serrated Tussock (*Nasella trichotoma*) is infesting the reserve across the southern boundary, isolated plants also occur along the western boundary. Coordinating a spraying program for this

species in conjunction with neighbours to the south and west will provide a more effective treatment program.



Figure 9. *Serrated Tussock* has established a foothold in the south of the addition

- Fauna Management

While outside the scope of this (vegetation) assessment, several other environmental management issues were observed in the field which are applicable to fauna management within the reserve. In order to provide for the highest standards in environmental protection, the following observations and suggestions are provided to facilitate an inclusive approach to implementation of priority environmental management issues (as found), and not limiting this advice to flora issues.

1. Blackthorn (*B. spinosa*) was observed in a number of locations through the Addition, a stand located south-west (up-slope) from WPT 107 had characteristics suggestive of occupation by the Purple Copper Butterfly (*Paralucia spinifera*); this stand of potential habitat needs to be checked during the butterflies flying season (September-October) for use by the butterfly.
2. The immaturity of the forests of the addition make it an ideal location to do spotlight surveys for arboreal fauna (possums), and trials with nest boxes. Putting up a variety of nest boxes improves habitat values for species which may be re-colonising a maturing forest, and provides a ready way to survey this section of the fauna. Bathurst Mens Shed is making nest boxes according to demand, and a program of habitat enhancement of this nature may be an effective way to secure the Powerful Owls which reside within and around the reserve and associated ranges.

3. The western boundary is in the process of being fenced: the fence being erected is totally inappropriate for a boundary of a nature conservation area (see Figure 10).

Barbed wire has been identified as a direct threat to species such as gliding possums and nightbirds, indeed a dead Powerful Owl was removed from a fence bordering Winburndale Nature Reserve recently (*pers comm* I McArtney). Mesh creates a barrier to movement of macropods across fencelines, making them attempt to jump over the fence, which can result in injury and death, and separates mothers from their joeys.

There is a lot of literature on fauna friendly fencing, NPWS need to act as a *matter of highest priority* liaise with the neighbour to the west of the Addition to ensure that an appropriate fence can be constructed; at minimum this should include removal of barbed wire and mesh, and installing kangaroo “gates” where trails intersect the fence.



Figure 9. *Replacing an old fence with a new fence is obviously disrupting local fauna – the damage to the fence (ruffled mesh) indicates animals are likely to have already been injured*

References

- Department of Lands 2006 *Topoview* (interactive CD – topographic map series)
Dept. lands, Bathurst
- Commonwealth Parliament 1999 *Environment Protection & Biodiversity Conservation Act*
- DECC 2009 *Vegetation Eusdale* (ARCVIEW layer)
- Harden G (ed) Vol 1-4 1992, 1993, 2000, 2002 *The Flora of NSW*
NSWU Press, Sydney
- NSW Parliament 1995 *Threatened Species Conservation Act*
NSW Government Information Service, Sydney
- NSW NPWS 2009 *Atlas of NSW Wildlife* Database - incremental update
- NSW Scientific Committee 2002 *Final Determination to list White Box Yellow Box Blakely's Red Gum as an Endangered Ecological Community* Government Gazette, Sydney
- Macdonald RC, Isbell RF, Speight JG, Walker J, Hopkins MS 1998 *Australian Soils & Land Survey Field Handbook* Goanna Print, Canberra
- Mjadwesch R 2011 *The Vegetation of the Mount Horrible Additions to Winburndale nature Reserve* MESS, Bathurst
- Thackway R, Cresswell ID 1995 *An Interim Biogeographic Regionalisation for Australia: A Framework for Setting Priorities in the National Reserves System* Australian Nature Conservation Agency, Canberra

Appendix 1. Quadrat photos (SW corner)

Quadrat E1.





DECC BIODIVERSITY CONSERVATION UNIT FLORA FIELD PROFORMA – MODULE 1

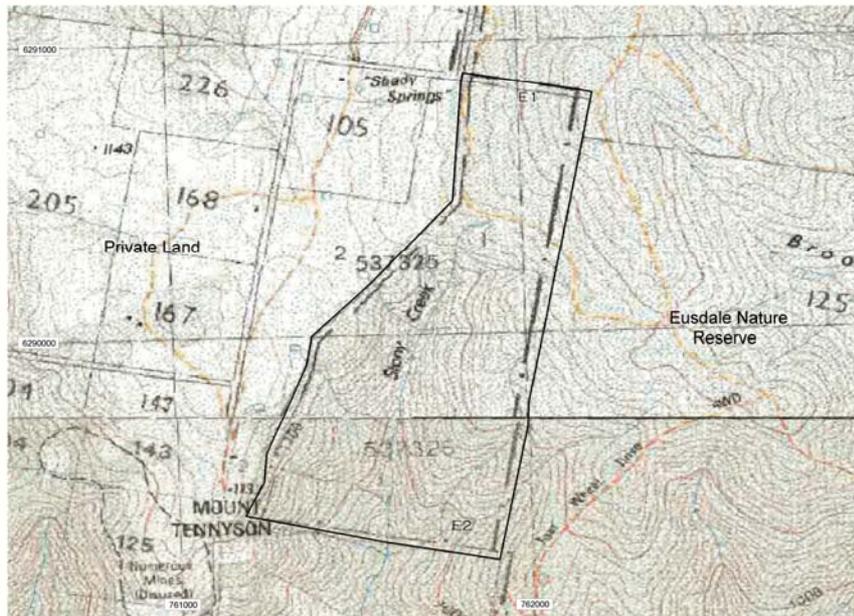
Species / Community name(s)	Grassy Dry Forest		
Extent / Count (est. or actual)	Extent:	Count:	
Record Detail	New Record: Y / N	If existing, Atlas #:	
Previous Recorders at site (if applicable)			
Other Modules Used	<input type="checkbox"/> Module 2 <input type="checkbox"/> Module 3 <input checked="" type="checkbox"/> Module 4 <input checked="" type="checkbox"/> Module 5 <input type="checkbox"/> Module 6 <input type="checkbox"/> Module 7		

		Site ID	Plot No.	Recorders
Date	29/7/2011	Eusdale NR	E1	Mjadwesch R
WPT	zone datum	Easting:	Northing:	Position in Quadrat / population
95	54 55 56	762129	6290996	(e.g. NE corner): SW
Survey Name	Eusdale Stony Creek Addition			
Land Use	(dominant) nature conservation	travelling stock route	forestry	former grazing grazing / cropping cropping other:
Tenure				

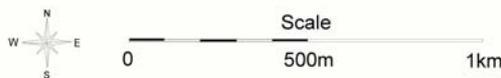
* If additional waypoints used, indicate here and refer to 2nd page or Module 7

Contact Details	Owner	Manager	Other:
Name:	OEH - NPWS		
Ph:	(02) 6332 7640		
Fax:			
Email:			
Preferred call time / date:			

Figure 7. Eusdale Nature Reserve: Stony Creek Addition



Source: Topoview
1:25 000 Topographic Map Series
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Legend

Directions: E1 is adjacent to the south of the Shady Springs Fire Trail, which defines the northern boundary of the addition.

Field Flora Proformas

MODULE 1: MINIMUM REQUIREMENTS

Department of Environment & Climate Change NSW





Physiography

Terrain	Landform Classification (refer to Australian Soil and Land Survey Handbook)
Elevation: 1198m ASL	Morphological Type:
Slope: 14°	Landform Element:
Aspect: 25°	Landform Pattern:
Microrelief (e.g gilgai):	

Waypoints (datum / zone as indicated on previous page) NB. If likely to take more than 10 waypoints, use Module 7.

Waypoint Name	Description
95	SW corner

Photos NB. If likely to take more than 15 photos, use Module 7

Photo #	Description
1-3	Quadrat L, M & R
4-5	Quadrat oblique
6	Quadrat character
7	groundcover
8-11	Flora [Bracspat / Luzuflac (2), Senedias (2)]

Notes

Include observations on microhabitat, sex, threats etc. if known



DECC BIODIVERSITY CONSERVATION UNIT FLORA FIELD PROFORMA – MODULE 4

Link with Module 1

Species / Community name(s)		Grassy Dry Forest					
Date	29/7/2011	Site ID	Eusdale Addition	Plot #	E1	Recorder: R Mjadwesch	
Survey Name		Eusdale Nature Reserve – Stony Creek Addition					

Survey Unit Extent / Survey Method:

(Indicate how assessed area is defined. E.g. quadrat, community, remnant etc): 20x20m vegetation quadrat

Strata Description	Number of Strata: 3	Simple (<= 3) <input checked="" type="checkbox"/>	Complex (> 3) <input type="checkbox"/>
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Strata diagram
Photos provided

Dominance in simple strata (3) (within defined area as per survey method)

Stratum	Growth form	Species name	Cover	Abund	Height to crown			Field No.
					min	max	med	
Upper		<i>Eucadive</i>	25	15		15		
Upper		<i>Eucadalr</i>	5	1		16		
Upper								
Mid		<i>Davelate</i>	2	40		1.2		
Mid		<i>Persline</i>	<1	5		1.5		
Mid		<i>Davelept</i>	2	40		0.6		
Mid		<i>Platform</i>	2	100		0.4		
Ground		<i>Poasieb2</i>	1	100		0.5		
Ground		<i>Joycpall</i>	40	200		0.6		
Ground		<i>Lomafili</i>	1	100		0.2		
Ground		<i>Pterescu</i>	5	50		0.7		



DECC BIODIVERSITY CONSERVATION UNIT FLORA FIELD PROFORMA – MODULE 5

Link with Module 1

Species / Community name(s)		Grassy Dry Forest					
Date	29.7.2011	Site ID	Eusdale	Plot #	E2	Recorders: Mjadwesch R	
Survey Name		Eusdale Stony Creek Addition					
Quadrat Dimensions		20 x 50m <input type="checkbox"/>	20 x 20m <input checked="" type="checkbox"/>	Other: x m <input type="checkbox"/>			

Floristics (within quadrat)

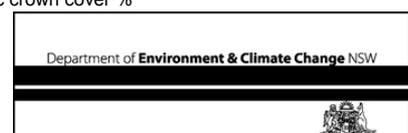
	Field name (scientific or common)	Species name (scientific, confirmed)	Cover	Abund	Field No.	RBG No.
	1x1 Eucadive	Eucalyptus dives	25	15		
	Lomafili	Lomandra filiformis	1	100		
	Poasieb2	Poa sieberiana sieberiana	1	100		
	Platform	Platylobium formosum	2	100		
	Poramicr	Poranthera microphylla	<1	200		
	Luzuflac (nfm)	Luzula flaccida	<1	100		
	Hyporadi	Hypochaeris radicata	<1	20		
	Joycpall	Joycea pallida	40	200		
	2x2 Pterescu	Pteridium esculentum	5	50		
	Hoveline	Hovea linearis	<1	2		
	Stylgram	Stylidium graminifolium	<1	2		
	5x5 Bracspat	Brachyscome spathulata	<1	20		
	Lissstri	Lissanthe strigosa	<1	10		
	Senedias	Senecio diaschides	<1	1		
	Davelate	Daviesia latefolia	2	40		
	Entostri	Entolasia stricta	<1	5		
	10x10 Persline	Persoonia linearis	<1	5		
	Hibbobtu	Hibbertia obtusifolia	<1	10		
	Gonotetr	Gonocarpus tetragynus	<1	20		
	Dian (young leaves, not revolute)	Dianella revoluta	<1	20		
	Gomphueg	Gompholobium huegelii	<1	10		
	Davelept	Daviesia leptophylla	2	40		
	20x20 Eucadalr	Eucalyptus dalrympleana	5	1		
	Pimelea	Pimelea curviflora v. curviflora	<1	1	46	
	Cassinia (small leaves)	Cassinia arcuata	<1	1	47	
	Acacgunn	Acacia gunnii	<1	1		
	Hardviol	Hardenbergia violacea	<1	1		

Growth form: T=tree, M=mallee tree, S=shrub, Y=mallee shrub, Z=heath shrub, C=chenopod shrub, G=tussock grass, H=hummock grass, D=sod grass, V=sedge, R=rush, E=fern, F=forb, L=vine, A=cycad, P=palm, X=xanthorrhoea, U=samphire shrub.

Cover: <1,1,2,3,4,5, 10,15,20,25,30,35, etc crown cover %
Abund: 1,2,3,4,5,6,7,8,9,10, 20,50,100,500,1000,>1000

BCU Standard (DRAFT v1)
Field Flora Proformas

MODULE 5: FULL-FLORISTIC QUADRAT



Quadrat E2





DECC BIODIVERSITY CONSERVATION UNIT FLORA FIELD PROFORMA – MODULE 1

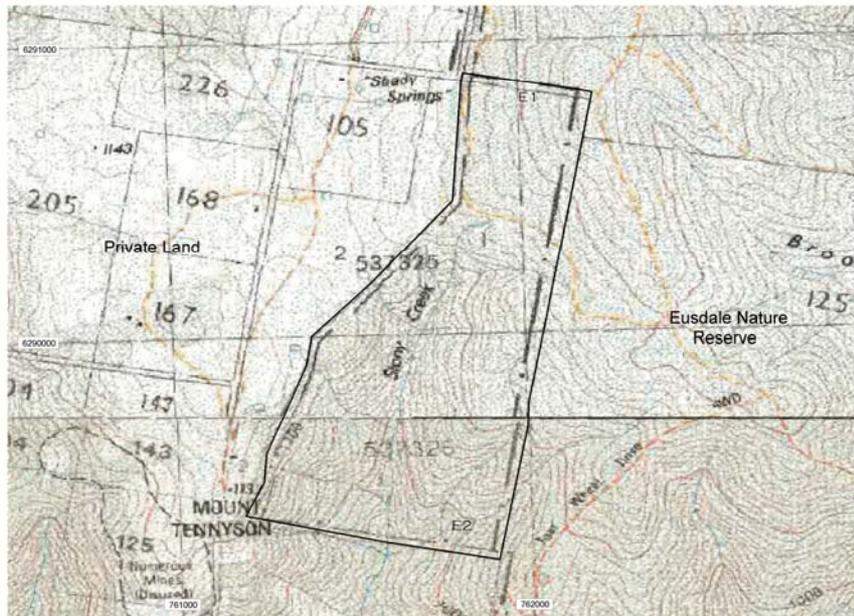
Species / Community name(s)	Yellow Box Grassy Woodland		
Extent / Count (est. or actual)	Extent:	Count:	
Record Detail	New Record: Y / N	If existing, Atlas #:	
Previous Recorders at site (if applicable)			
Other Modules Used	<input type="checkbox"/> Module 2 <input type="checkbox"/> Module 3 <input checked="" type="checkbox"/> Module 4 <input checked="" type="checkbox"/> Module 5 <input type="checkbox"/> Module 6 <input type="checkbox"/> Module 7		

	Site ID	Plot No.	Recorders				
Date	29/7/2011	Eusdale NR	E1	Mjadwesch R			
WPT	zone datum	Easting:	Northing:	Position in Quadrat / population (e.g. NE corner):			
97	54 55 56	761891	6289553	SW			
Survey Name	Eusdale Stony Creek Addition						
Land Use	(dominant) nature conservation	travelling stock route	forestry	former grazing	grazing / cropping	cropping	other:
Tenure							

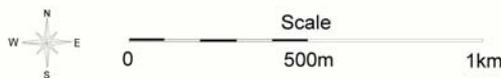
* If additional waypoints used, indicate here and refer to 2nd page or Module 7

Contact Details	Owner	Manager	Other:
Name:	OEH - NPWS		
Ph:	(02) 6332 7640		
Fax:			
Email:			
Preferred call time / date:			

Figure 7. Eusdale Nature Reserve: Stony Creek Addition



Source: Topoview
1:25 000 Topographic Map Series
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Legend

Directions: E2 is at the foot of a spur descending to the south west from Gemalla Fire Trail.





DECC BIODIVERSITY CONSERVATION UNIT FLORA FIELD PROFORMA – MODULE 4

Link with Module 1

Species / Community name(s)		Yellow Box Grassy Woodland					
Date	29/7/2011	Site ID	Eusdale Addition	Plot #	E2	Recorder: R Mjadwesch	
Survey Name		Eusdale Nature Reserve – Stony Creek Addition					

Survey Unit Extent / Survey Method:

(Indicate how assessed area is defined. E.g. quadrat, community, remnant etc): 20x20m vegetation quadrat

Strata Description	Number of Strata: 3	Simple (<= 3) <input checked="" type="checkbox"/>	Complex (> 3) <input type="checkbox"/>
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Strata diagram

Photos provided

Dominance in simple strata (3) (within defined area as per survey method)

Stratum	Growth form	Species name	Cover	Abund	Height to crown			Field No.
					min	max	med	
Upper		<i>Eucabrid</i>	20	8		14		
Upper		<i>Acacmela</i>	10	5		16		
Upper		<i>Eucamell</i>	5	1		15		
Mid		<i>Bursspin</i>	1	10		1		
Mid		<i>Cassarcu</i>	1	5		0.6		
Mid								
Mid								
Ground		<i>Stiprudi</i>	1	50		1.5		
Ground		<i>Dantrace</i>	30	>1000		0.3		
Ground		<i>Poasieb2</i>	5	200		0.2		
Ground		<i>Joycpall</i>	1	10		1.5		





DECC BIODIVERSITY CONSERVATION UNIT FLORA FIELD PROFORMA – MODULE 5

Link with Module 1

Species / Community name(s)		Yellow Box Grassy Woodland					
Date	29.7.2011	Site ID	Eusdale	Plot #	E2	Recorders: Mjadwesch R	
Survey Name		Eusdale Stony Creek Addition					
Quadrat Dimensions		20 x 50m <input type="checkbox"/>	20 x 20m <input checked="" type="checkbox"/>	Other: x m <input type="checkbox"/>			

Floristics (within quadrat)

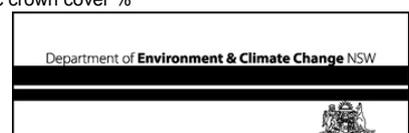
	Field name (scientific or common)	Species name (scientific, confirmed)	Cover	Abund	Field No.	RBG No.
	1x1 Stelpung	Stellaria pungens	1	100		
	Hydrilaxi	Hydrocotyle laxiflora	1	200		
	Acaena	Acaena agnipila	1	10	48	
	Cynoglossum (no bracts)	Cynoglossum australe	<1	50		
	Acetvulg	Acetosella vulgaris	<1	20		
	Echium (narrow leaf)	Echium vulgare	<1	50		
	Plantago (tiny leaf, long scape)	Plantago debilis	<1	5		
	Poasieb2	Poa sieberiana sieberiana	5	200		
	Clematis (twisted petiole)	Clematis glycinoides	2	50		
	Crassieb	Crassula sieberi	<1	5		
	Stelmedi	Stellaria media	<1	50		
	Echiovat	Echinopogon ovatus	1	100		
	Dant (fine)	Austrodanthonia racemosa	30	>1000		
	Oxalpere	Oxalis perennans	<1	10		
	Anagarve	Anagallis arvensis	<1	20		
	Eucabrid	Eucalyptus bridgesiana	20	8		
	Acacmela	Acacia melanoxylon	10	5		
	Hypoglab	Hypochaeris glabra	<1	10		
	2x2 Micrstip	Microlaena stipoides	20	>1000		
	Soncoler	Sonchus oleraceus	<1	5		
	Silymari	Silybum marianum	<1	2		
	Cymblaws	Cymbonotus lawsonianus	<1	20		
	Ranulapp (seedlings)	Ranunculus lappulaceus	<1	10		
	Pateseri	Patersonia sericea	<1	5		
	Veropleb	Veronica plebia	<1	10		
	5x5 Stiprudi	Austrostipa rudis nervosa	1	50		
	Cheisieb	Cheilanthes sieberi	<1	20		
	Crepcapi (runcinate teeth)	Chondrilla juncea	<1	5		
	Senetenu	Senecio tenuiflorus	<1	5		
	Eucamell	Eucalyptus melliodora	5	1		

Growth form: T=tree, M=mallee tree, S=shrub, Y=mallee shrub, Z=heath shrub, C=chenopod shrub, G=tussock grass, H=hummock grass, D=sod grass, V=sedge, R=rush, E=fern, F=forb, L=vine, A=cycad, P=palm, X=xanthorrhoea, U=samphire shrub.

Cover: <1,1,2,3,4,5, 10,15,20,25,30,35, etc crown cover %
Abund: 1,2,3,4,5,6,7,8,9,10, 20,50,100,500,1000,>1000

BCU Standard (DRAFT v1)
Field Flora Proformas

MODULE 5: FULL-FLORISTIC QUADRAT



Appendix 2. Opportunistic Fauna Observations: Stony Creek

Genus species	Common Name
REPTILES	
<i>Hemiergis decresiensis</i>	
BIRDS	
<i>Aquila audax</i>	Wedge-tailed Eagle
<i>Callocephalon fimbriatus</i>	Gang-gang Cockatoo
<i>Platycercus elegans</i>	Crimson Rosella
<i>Climacteris leucophaeus</i>	White-throated Treecreeper
<i>Dacelo novahollandiae</i>	Kookaburra
<i>Manorina melanocephala</i>	Noisy Miner
<i>Colluricincla harmonia</i>	Grey Shrike-thrush
<i>Gymnorhina tibicen</i>	Australian Magpie
<i>Strepera versicolor</i>	Grey Currawong
<i>Strepera graculina</i>	Pied Currawong
<i>Corvus coronoides</i>	Australian Raven
MAMMALS	
<i>Vombatus ursinus</i>	Common Wombat (scats + 1)
<i>Trichosurus vulpecula</i>	Common Brush-tailed Possum (scats)
<i>Wallabia bicolor</i>	Swamp Wallaby (1/1)
<i>Macropus giganteus</i>	Eastern Grey Kangaroo (5/3)
<i>Macropus rufogriseus</i>	Red-necked Wallaby (1)
<i>Capra hircus</i>	Feral Goat (16/2/3)



Swamp Wallaby



Eastern Grey Kangaroo



Feral Goats



...then he turned and moved off down the tunnel, and out of sight.