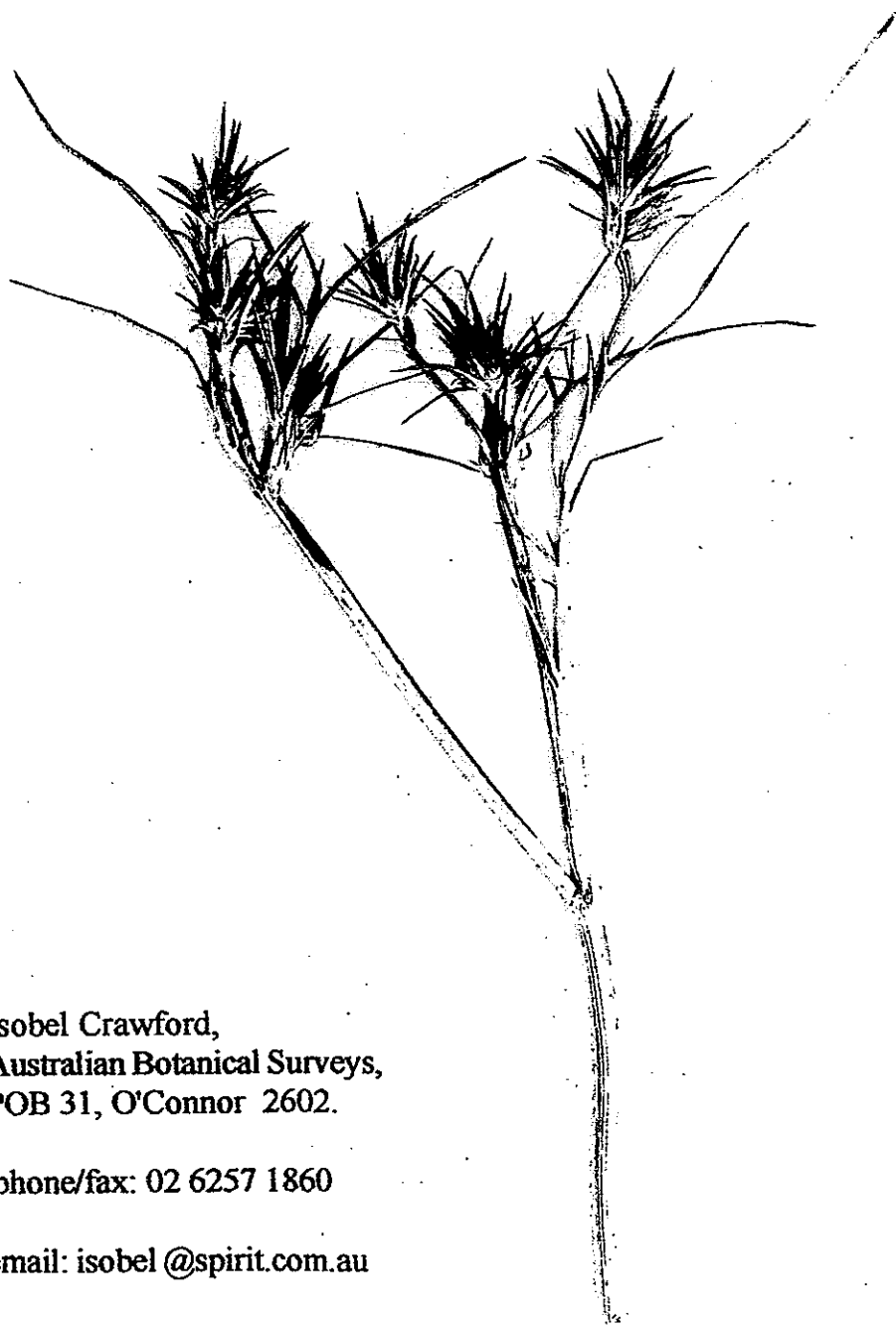


**Umbagog District Park Blue Devil Grassland: an inventory of plant  
and animal species and suggested management activities.**

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## 1. INTRODUCTION

### 1.1 Aims of survey and scope of report

The aims of this survey were to:

- i) re-survey the vegetation of the south-western corner of Umbagog District Park, and to prepare a list of plant and animal species recorded there over the last decade;
- ii) compare this area with other nearby patches of remnant grassland and grassy woodland;
- iii) identify the principal management issues, and
- iv) suggest management practices to conserve or improve the quality of the vegetation and fauna habitat on the site.

The report describes the study area (1.2), other biological work done in the Park (1.3) and the methods used to prepare this report (2). Lists of plants (3) and animals (4) are presented, and the quality of the vegetation compared with that on Belconnen Naval Station (5). Management issues (6.1) are discussed and recommendations made (6.2) to improve the quality of the vegetation and its value as animal habitat.

### 1.2 Study area

Umbagog District Park covers more than 50 ha along Ginninderra Creek in the suburb of Latham. The portion surveyed for this report (areas 1-3) is c. 8 ha south of Ginninderra Creek, on the eastern corner of Florey and Southern Cross Drives, in particular the Blue Devil Grassland (area 2, 2.8 ha), seen as the best quality patch of grassland in the Park (Appendix 1).

The Blue Devil Grassland is section 129, Latham, and is categorised in the Territory Plan as 'public land exclusion overlay code x' which excises it from the remainder of the Park, classified as urban open space (Land (Planning and Environment) Act 1991). The Landcare Group is seeking to have S. 129 re-classified as public open space, so that it may not be built upon. This re-classification is supported by the Action Plan for Natural Temperate Grassland (ACT Government 1997) which categorised this site as having 'moderate conservation value' and a 'botanical significance rating' of 3.

Responsibility for management of the Park is presently taken by the Urban Landcare Co-ordinator and the Umbagog Park Landcare Group.

The altitude ranges from below 550 m to c. 575 m. The parent rock is early Late Silurian volcanics (purple-pink rhyolite), overlain by a patch of Quaternary Alluvium along the Creek (Henderson & Matveev 1980).

The vegetation is more or less highly modified native grassland with woodland on the higher slopes, largely planted with local and non-local Australian plant species, and with Willows *\*Salix spp.* along the Creek. The latter are gradually being removed (Griffin-Warwicke 1998, Ormay 1998, Nicholson 2000).

### 1.3 Other biological work

Sarah Sharp carried out a brief inspection of some of the grassland vegetation in January 1992 as part of a project at the University of Canberra. Alison Rowell surveyed flora and fauna in the Park from May to July, and November to December, 1992, and made recommendations for management and ecological enhancement (Rowell 1992, 1993). Sarah Sharp's earlier records were included in the earlier of these two reports.

Sarah Sharp and others from ACT Wildlife Research and Monitoring and the Umbagog Landcare Group have surveyed grassland in the Blue Devil Grassland since 1992. Three permanent transects have been monitored since 1995.

Peter Ormay from ACT Wildlife Research and Monitoring started monitoring frogs in the summer of 1998/99 along 'Kippax Creek', the unnamed tributary of Ginninderra Creek west of the Blue Devil Grassland. The survey point is c. 50 m above the bridge and the confluence with Ginninderra Creek.

Robert Cruickshank and other members of the Umbagog Landcare Group have kept records of flora and fauna observations in the Park. Robert Cruickshank has kept a diary of observations from the same three areas surveyed for this report (Appendix 1).

## 2. METHODS

The vegetation of the study area was surveyed on foot on 29 March and 14 November 1998, and 20 August and 27 September 1999, by walking over the site and recording plant and animal species. Herbarium vouchers were collected of plant species poorly represented in the Australian National Herbarium at CSIRO Canberra. Plant and animal records from this and other surveys listed above (1.3), including valuable diary entries from Robert Cruickshank, were collated to update the lists of plants and animals. Fifteen hours were allocated for the survey, obtaining other records and writing the report.

## 3. PLANT SPECIES RECORDED IN UMBAGONG DISTRICT PARK 1992-99.

Botanical names used are those currently in use at the Australian National Herbarium. Common names are from Burbidge & Gray (1970), Galbraith (1977) or Harden (1990-93). An asterisk indicates an introduced species. Eleven voucher specimens were collected and have been lodged at the Australian National Herbarium. Voucher numbers are given in brackets after the scientific name (e.g. IC 4974).

Of the c. 252 plant species recorded, 123 are native species occurring naturally on the site, 105 are introduced species and 29 are Australian species planted on the site (p following the scientific name in Table 1). Some of the planted species would also have occurred naturally on the site in the past, e.g. Candlebark *Eucalyptus rubida* ssp. *rubida* and Blakely's Red Gum *E. blakelyi*).

The following six native herb and shrub species are of particular interest (scientific name underlined in Table 1):

- *Aristida vagans* Three-awned Speargrass;
- *Bossiaea prostrata* Creeping Bossiaca;
- *Eryngium ovium* Blue Devil;
- *Laxmannia gracilis* Slender Wire-lily;
- *Microseris lanceolata* Yam Daisy; and
- *Pultenaea subspicata* a Bush Pea.

Three-awned Speargrass is an aptly name vagrant on the Southern Tablelands, more common on the slopes and plains further west. There are only two ACT collections at the Australian National Herbarium, one from London Circuit outside the former airlines booking office, the other along a track at Letchworth, west of the Queanbeyan cemetery. The other five species are highly palatable and no longer recorded from grassland and grassy woodland continuously grazed by introduced herbivores.

- 1, 2 and 3 (columns 4-6) refers to areas 1, 2 and 3 in the Blue Devil Grassland, in the south-western corner (Appendix 1), surveyed 1998-99 by Isobel Crawford.
- AR = species recorded by Alison Rowell from the whole of Umbagog District Park, from May-July and November-December 1992. This column (7) also includes species recorded by Sarah Sharp in January 1992 as part of a project at the University of Canberra.
- SS = species recorded later by Sarah Sharp and others up to and including summer 1999-2000, as part of monitoring work undertaken by the Wildlife Research and Monitoring unit of Environment ACT (column 8).

**Table 1. Plant species recorded in Umbagog District Park 1992-99.**

family	scientific name	common name	BVG 1	SPG 2	BVG 3	AR	SS
Aceraceae	✓ <i>*Acer negundo</i> Not SS	Box Elder			3		
Adiantaceae	✓ <i>Adiantum aethiopicum</i> Not SS	Maidenhair Fern				AR	
BT → Anthericaceae	✓ <i>Dichopogon fimbriatus</i> SS	Nodding Chocolate Lily	1		3	AR	SS
Anthericaceae	✓ <i>Tricoryne elatior</i> SS	Yellow Rush-lily	1	2	3	AR	SS
Anthericaceae x	<i>Loxomania gracilis</i> Not SS	Slender Wire-lily	1		3		
Apiaceae	✓ <i>*Anethum graveolens</i> Not SS	Dill			3		
Apiaceae	✓ <i>*Conium maculatum</i> Not SS	Hemlock			3		
Apiaceae	✓ <i>*Foeniculum vulgare</i> Not SS	Fennel		2	3		
Apiaceae	✓ <i>Eryngium ovinum</i> SS	Blue Devil	1	2	3	AR	SS
Araliaceae	✓ <i>*Hedera helix</i> Not SS	English Ivy		2		AR	
Asphodelaceae	✓ <i>Bulbine bulbosa</i> SS	Bulbine Lily, Golden Lily	1				
Aspleniaceae x	<i>Asplenium flabellifolium</i> Not SS	Necklace Fern				AR	
Aspleniaceae x	<i>Pleurosorus rutifolius</i> Not SS	Blanket Fern				AR	
Asteraceae	✓ <i>*Arctotheca calendula</i> SS	Capeweed, Cape Dandelion	1	2			
Asteraceae x	✓ <i>*Aster subulatus</i> Not SS	Wild Aster			3		
Asteraceae	✓ <i>*Chondrilla juncea</i> Not SS	Skeleton Weed	1	2			SS
Asteraceae x	<i>*Cichorium intybus</i> Not SS	Chicory		2	3		
Asteraceae x	<i>*Cirsium vulgare</i> Not SS	Spear Thistle		2	3		
Asteraceae	G <i>*Conyza albida</i> Not SS						SS
Asteraceae	G <i>*Conyza bonariensis</i> Not SS	Flaxleaf Fleabane	1	2	3		
Asteraceae x	<i>*Gnaphalium americanum</i> SS		1	2			
Asteraceae x	<i>*Gnaphalium</i> spp. SS						SS
Asteraceae x	<i>*Hypochaeris glabra</i> SS	Smooth Catsear	1	2	3		
Asteraceae x	<i>*Hypochaeris radicata</i> SS	Catsear, Flatweed	1	2	3	AR	SS
Asteraceae x	<i>*Lactuca serriola</i> Not SS	Prickly Lettuce	1	2	3		SS
Asteraceae x	<i>*Sonchus asper</i> ssp. Not SS	Prickly Sowthistle	1		3		
Asteraceae x	<i>glaucescens</i>						
Asteraceae x	<i>*Sonchus oleraceus</i> Not SS	Common Sowthistle		2			
Asteraceae x	<i>*Taraxacum officinale</i> SS	Dandelion		2	3		
Asteraceae x	<i>*Tolpis umbellata</i> SS	Yellow Hawkweed	1		3		SS
Asteraceae	G <i>*Tragopogon dubius</i> Not SS	Goatsbeard	1	2	3	AR	

→ papaver (probably oriental poppies?)  
Not SS

Not SS forget-me-nots?

Not SS. iris? 1

family	scientific name	common name	BDE 1	SPG 2	FF 3	AR	SS
Asteraceae	G * <i>Tragopogon porrifolius</i> Not SS	Salsify				AR	SS
Asteraceae	✓ <i>Cassinia quinquefaria</i> Not SS			2			
Asteraceae	✓ <i>Chrysocephalum apiculatum</i> SS	Common Everlasting, Yellow Buttons	1	2	3	AR	SS
Asteraceae	✓ <i>Chrysocephalum semipapposum</i> SS	Clustered Everlasting, Yellow Buttons		2			
Asteraceae	✓ <i>Cymbonotus lawsonianus</i> SS	Austral Bear's Ear	①				SS
Asteraceae	? <i>Euchiton involucratu</i> SS	Native Cudweed				AR	
Asteraceae	? <i>Euchiton sphaericus</i> SS		1	2	3		
Asteraceae	~ <i>Leptorhynchus squamatus</i> SS	Hairy Buttons				AR	
Asteraceae	x <i>Microseris lanceolata</i> SS	Yam Daisy					SS
Asteraceae	G <i>Senecio hispidulus</i> var. sterile Not SS	Hill Fireweed	1				
Asteraceae	G <i>Senecio quadridentatus</i> Not SS	Cotton Firetail	1	2	3	AR	SS
Asteraceae	✓ <i>Triptilodiscus pygmaeus</i> SS	Austral Sun ray	1				SS
Asteraceae	G <i>Vittadinia cuneata</i> var. <i>cuneata</i> SS	Fuzzweed				AR	SS
Asteraceae	G <i>Vittadinia gracilis</i> SS			2			
Asteraceae	G <i>Vittadinia muelleri</i> SS		1	2	3	AR	
Boraginaceae	x <i>Cynoglossum suaveolens</i> SS	Sweet Hound Tongue					SS
Boraginaceae	✓ <i>Echium plantagineum</i> SS	Paterson's Curse, Salvation Jane	1	2	3	AR	
Brassicaceae	✓ <i>Cardamine hirsuta</i> (IC 5510) Not SS	Common Bittercress, Hairy Woodcress		2			
Brassicaceae	x <i>Hirschfeldia incana</i> Not SS	Hairy Brassica, Buchan Weed		2	3	AR	
Campanulaceae	G <i>Wahlenbergia communis</i> SS	Tufted Bluebell	1	2		AR	
Campanulaceae	G <i>Wahlenbergia luteola</i> SS		1		3		SS
Campanulaceae	G <i>Wahlenbergia</i> spp. SS						SS
Caryophyllaceae	x <i>Cerastium glomeratum</i> Not SS	Mouse-ear Chickweed					SS
Caryophyllaceae	x <i>Moenchia erecta</i> Not SS	Erect Chickweed	1				
Caryophyllaceae	x <i>Paronychia brasiliiana</i> Not SS	Chilean Whitlow Wort, Brazilian Whitlow	1	2			
Caryophyllaceae	✓ <i>Petrorhagia nanteuillii</i> SS	Proliferous Pink	1	2	3		SS
Caryophyllaceae	? <i>Polycarpon tetraphyllum</i> Not SS	Four-leaved Allseed		2			
Caryophyllaceae	x <i>Silene gallica</i> var. <i>gallica</i> Not SS	French Catchfly		2			
Caryophyllaceae	✓ <i>Stellaria pungens</i> Not SS	Prickly Starwort				AR	
Casuarinaceae	✓ <i>Casuarina cunninghamiana</i> ssp. <i>cunninghamiana</i> p Not SS	River Oak, River Sheoak		2	3	AR	
Clusiaceae	✓ <i>Hypericum perforatum</i> SS	St John's Wort	①	②	3		
Clusiaceae	✓ <i>Hypericum gramineum</i> SS	Small St John's Wort	1		3	AR	SS
Colchicaceae	✓ <i>Wurmbea dioica</i> ssp. <i>dioica</i> SS	Early Nancy	①	2			

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"Native forget-me-nots?"

*Sisymbrium irio* (mustard weed)

family	scientific name	common name	BDF			AR	SS
			1	2	3		
Convolvulaceae	✓ <i>Convolvulus erubescens</i> SS	Australian Bindweed	1		3	AR	SS
Convolvulaceae	✓ <i>Dichondra repens</i> SS	Kidneyweed	(1)				SS
Crassulaceae x	<i>Crassula decumbens</i> var. <i>decumbens</i> not SS				3		
Crassulaceae x	<i>Crassula sieberiana</i> not SS	Australian Stonecrop	1	2			
Cyperaceae	✓ <i>Carex appressa</i> SS			2	3		
Cyperaceae	<i>Carex bichenoviana</i> not SS			2	3		
Cyperaceae	6 { <i>Carex breviculmis</i> SS	Short-stem Sedge		2			
Cyperaceae	<i>Carex inversa</i> SS	Knob Sedge	1		3		SS
Cyperaceae x	<i>Eleocharis acuta</i> not SS	a Spike-rush			3		
Cyperaceae	<i>Isolepis cernua</i> not SS	Nodding Club-rush	1		3		
Cyperaceae	✓ <i>Schoenoplectus validus</i> not SS	River Club-rush			3		
Cyperaceae	<i>Schoenus apogon</i> SS		1	2	3		
Dilleniaceae x	<i>Hibbertia calycina</i> SS	Lesser Guinea Flower				AR	
Droseraceae	✓ <i>Drosera peltata</i> SS	a Sundew	(1)		3		
Euphorbiaceae ?	<i>Chamaesyce drummondii</i> not SS	Caustic Weed					SS
Fabaceae x	* <i>Medicago</i> sp. not SS	a Burr Medic			3		
Fabaceae x	* <i>Trifolium angustifolium</i> SS	Narrow-leaved Clover		2	3		
Fabaceae	* <i>Trifolium arvense</i> SS	Haresfoot Clover	1	2	3	AR	
Fabaceae	* <i>Trifolium campestre</i> SS	Hop Clover	1	2	3		
Fabaceae x	* <i>Trifolium dubium</i> SS	Yellow Suckling Clover			3		
Fabaceae	* <i>Trifolium glomeratum</i> SS	Clustered Clover	1	2			
Fabaceae	* <i>Trifolium repens</i> SS	White Clover			3	AR	
Fabaceae	* <i>Trifolium striatum</i> not SS	Striated Clover			3		
Fabaceae	* <i>Trifolium subterraneum</i> SS	Subterranean Clover	1	2		AR	SS
Fabaceae	* <i>Trifolium</i> sp.			2	3		
Fabaceae	✓ * <i>Vicia sativa</i> ssp. <i>angustifolia</i> (IC 4975) not SS	Narrow-leaved Vetch					
Fabaceae x	<i>Bossiaea prostrata</i> not SS	Creeping Bossiaca		2			
Fabaceae x	<i>Cullen microcephalum</i> SS	Mountain Psoralea				AR	
Fabaceae	6 { <i>Desmodium varians</i> SS	Slender Tick-trefoil		2	3	AR	SS
Fabaceae	6 { <i>Glycine clandestina</i> SS	Twining Glycine				AR	
Fabaceae	6 { <i>Glycine tabacina</i> SS						SS
Fabaceae x	<i>Pultenaea subspicata</i> not SS	a Bush Pea				AR	
Gentianaceae x	✓ * <i>Centaurium erythraea</i> SS	Common Centaury	1	2	3	AR	SS
Geraniaceae	6 * <i>Erodium botrys</i> not SS	Long Storksbill		1	2		
Geraniaceae	6 * <i>Erodium cicutarium</i> SS	Common Storksbill, Common Crowfoot		1	2		
Geraniaceae	✓ <i>Erodium crinitum</i> SS	Blue Storksbill, Blue Crowfoot		1	2		
Geraniaceae	✓ <i>Geranium solanderi</i> var. <i>solanderi</i> SS	Native Geranium		2	3		

*Erodium moschatum* ?

On blank page opposite:

"Capella bursa-pastoris"  
Shepherd's purse along dirt track



576-581

family	scientific name	common name	1	2	3	AR	SS
Goodeniaceae	✓ <i>Goodenia pinnatifida</i> SS	Scrambled Eggs	SS	1	(2) 3	AR	
Haloragaceae	<i>Haloragis heterophylla</i> SS	Variable Raspwort		1	2 3		
Juncaceae	<i>Juncus</i> sp. p (sterile)				3		
Juncaceae	* <i>Juncus articulatus</i> not SS				3		
Juncaceae	* <i>Juncus capitatus</i> SS				3		
Juncaceae	* <i>Juncus bufonius</i> SS	Toad Rush		1	3		
Juncaceae	<i>Juncus filicaulis</i> SS				2 3		
Juncaceae	<i>Juncus flavidus</i> not SS			1	3		
Juncaceae	<i>Juncus homalocaulis</i> not SS				3		
Juncaceae	<i>Juncus subsecundus</i> SS				2 3		
Lamiaceae	✓ * <i>Salvia verbenaca</i> SS	Wild Sage		(1) 2			
Lomandraceae	<i>Lomandra bracteata</i> SS	a Mat-rush		1	2 3		
Lomandraceae	<i>Lomandra filiformis</i> ssp. SS	Wattle Mat-rush			2 3		SS
BT → Lomandraceae	<i>Lomandra coriacea</i>						
Lomandraceae	<i>Lomandra longifolia</i> SS	Matrush			(2) 2	AR	
Lomandraceae	<i>Lomandra multiflora</i> ssp. SS	Many-flowered Mat-rush			2		
Lythraceae	✓ <i>Lythrum hyssopifolia</i> not SS	Hyssop Loosestrife		1	2 3		
Lythraceae	✓ <i>Lythrum salicaria</i> not SS	Purple Loosestrife			3		
Malvaceae	* <i>Malva parviflora</i> not SS	Small-flowered Mallow			3		
Malvaceae	* <i>Modiola caroliniana</i> not SS	Red-flowered Mallow			3		
Mimosaceae	<i>Acacia baileyana</i> p not SS	Cootamundra Wattle		1	2 3		
Mimosaceae	<i>Acacia cultriformis</i> p not SS	Knife-leaved Wattle			2		
Mimosaceae	✓ <i>Acacia dealbata</i> SS	Silver Wattle		1		AR	
Mimosaceae	<i>Acacia floribunda</i> p not SS	White Sally		1			
Mimosaceae	<i>Acacia implexa</i> not SS	Hickory Wattle			3	AR	
Mimosaceae	<i>Acacia mearnsii</i> p SS	Black Wattle		1	2 3	AR	
Mimosaceae	<i>Acacia melanoxylon</i> p not SS	Blackwood			2		
Mimosaceae	<i>Acacia pravissima</i> p not SS	Wedge-leaved Wattle			3		
Mimosaceae	<i>Acacia rubida</i> p not SS	Red-leaved Wattle			2 3	AR	
Myrtaceae	<i>Callistemon sieberi</i> not SS	River Bottlebrush				AR	
Myrtaceae	<i>Callistemon ?pallidus</i> or <i>salignus</i> p not SS	a Bottlebrush			3		
Myrtaceae	<i>Eucalyptus blakelyi</i> p SS	Blakely's Red Gum			2		
Myrtaceae	<i>Eucalyptus camaldulensis</i> p not SS	River red Gum				AR	
Myrtaceae	<i>Eucalyptus cinerea</i> p not SS	Argyle Apple		1	3		
Myrtaceae	<i>Eucalyptus elata</i> p not SS	River Peppermint			2		
Myrtaceae	<i>Eucalyptus macrorhyncha</i> p not SS	Red Stringybark			3		
BT → Myrtaceae	<i>Eucalyptus mannifera</i> ssp. SS	Spotted Gum		1	2 3		
Myrtaceae	<i>Eucalyptus melliodora</i> SS	Yellow Box		1	3		
Myrtaceae	<i>Eucalyptus nicholii</i> p not SS	Narrow-leaved Black Peppermint			2		

family	scientific name	common name	BDB SPK 244			AR	SS
			1	2	3		
Myrtaceae	<i>Eucalyptus nortonii</i> p not SS	Long-leaved Box	1	2			
Myrtaceae	<i>Eucalyptus pauciflora</i> ssp. <i>pauciflora</i> p SS	White Sally			3		
Myrtaceae	<i>Eucalyptus polyanthemos</i> p not SS	Red Box	1	2	3		
Myrtaceae	<i>Eucalyptus rubida</i> ssp. <i>rubida</i> p SS	Candlebark			3		
Myrtaceae	6 { <i>Eucalyptus</i> sp. p			2			
Myrtaceae	<i>Eucalyptus</i> sp. p not SS	a Blue Gum		2			
Myrtaceae	<i>Eucalyptus</i> sp. ironbark p				3		
Myrtaceae	<i>Eucalyptus stellulata</i> p SS	Black Sally				AR	
Myrtaceae	<i>Eucalyptus viminalis</i> p SS	Ribbon Gum	1		3		
Myrtaceae	<i>Leptospermum ?obovatum</i> p not SS	a Tea-tree			3		
Myrtaceae	<i>Melaleuca parvistaminea</i> p not SS	a Melaleuca	1		3		
Oleaceae	✓ <i>Ligustrum lucidum</i> not SS	Large-leaved Privet		2	3	AR	
Oleaceae	✓ <i>Ligustrum sinensis</i> not SS	Small-leaved Privet		2	3	AR	
Onagraceae	✓ <i>Oenothera stricta</i> ssp. <i>stricta</i> SS	Evening Primrose	1	2	3		
Onagraceae	6 { <i>Epilobium billardierianum</i> SS	a Willow Herb	1	2			SS
Onagraceae	ssp. <i>cinereum</i>						
Onagraceae	6 { <i>Epilobium billardierianum</i> SS	a Willow Herb			3		
Onagraceae	ssp. <i>hydrophilum</i>						
Orobanchaceae x	<i>Orobanche minor</i> not SS	Orobanche	1	2			SS
Orchidaceae x	<i>Microtis unifolia</i> SS	Common Onion Orchid	1		3	AR	SS
Oxalidaceae	6 { <i>Oxalis corniculata</i> not SS	an Oxalis					SS
Oxalidaceae	<i>Oxalis perennans</i> SS	an Oxalis	1		3		
Oxalidaceae	<i>Oxalis</i> sp. ?* (sterile) not SS	an Oxalis		2			
BT → Phormiaceae	✓ <i>Dianella revoluta</i> var. <i>revoluta</i> (longifolia?) SS	a Blue Flax Lily		2			
Plantaginaceae	6 { <i>Plantago lanceolata</i> SS	Lamb's Tongues, Ribbed Plantain	1	2	3	AR	SS
Plantaginaceae	<i>Plantago major</i> (IC 5511) not SS						
BT → Plantaginaceae	✓ <i>Plantago varia</i> SS	Variable Plantain	①		3	AR	SS
Poaceae	<i>Aira elegantissima</i> SS	Delicate Hairgrass	1	2	3		
Poaceae	<i>Aira</i> sp. SS						SS
Poaceae	6 { <i>Avena barbata</i> (IC 5527) not SS	Bearded Oats	1	2	3	AR	
Poaceae	<i>Avena fatua</i> SS						SS
Poaceae	<i>Avena</i> sp.						SS
Poaceae x	<i>Briza maxima</i> SS	Quaking Grass		2			
Poaceae	<i>Briza minor</i> SS	Shivery Grass	1	2	3		SS
Poaceae	<i>Bromus catharticus</i> SS	Prairie Grass	1	2	3		
Poaceae	<i>Bromus diandrus</i> SS	Great Brome		2	3		SS
Poaceae	<i>Bromus hordeaceus</i> SS	a Soft Brome					SS
Poaceae	<i>Bromus molliformis</i> SS	a Soft Brome	1	2	3		SS
Poaceae	✓ <i>Dactylis glomerata</i> SS	Cocksfoot	1	2	3	AR	
Poaceae	✓ <i>Eleusine tristachya</i> not SS	Goose Grass, Crab Grass			3		

family	scientific name	common name	1	2	3	AR	SS
Poaceae	✓ *Eragrostis curvula SS	African Lovegrass	1	(2)	3	AR	
Poaceae	✓ *Festuca elatior SS	Tall Fescue	1	2	3	AR	SS
Poaceae	✓ *Holcus lanatus SS	Yorkshire Fog	1	2	3	AR	SS
Poaceae	✓ *Lolium perenne SS	Perennial Ryegrass	1	2	3		
Poaceae	✓ *Nassella neesiana SS	Chilean Needle Grass	(1)	(2)	3	AR	
Poaceae	✓ *Nassella trichotoma SS	Serrated Tussock, Yass Tussock	(1)		3		
Poaceae	✓ *Paspalum dilatatum not SS	Paspalum	1	2	3	AR	SS
Poaceae	*Pennisetum clandestinum not SS	Kikuyu Grass		2			
Poaceae	✓ *Phalaris aquatica SS	Phalaris	1	2	3	AR	SS
Poaceae	*Poa annua SS	Winter Grass, Annual Poa			3		
Poaceae	*Poa pratensis not SS	Kentucky Bluegrass		2	3		
Poaceae	*Psilurus incurvus not SS	Bristle-tail Grass	1	2			
Poaceae	*Sorghum sp. not SS	Sorghum			3		
Poaceae	*Vulpia bromoides SS	Squirrel Tail Fescue	1		3		
Poaceae	*Vulpia sp.						SS
Poaceae	Agrostis avenacea var. avenacea SS			2			
Poaceae	Aristida ramosa var. ramosa		1				SS
Poaceae	Aristida vagans SS	Three-awned Speargrass				AR	
Poaceae	Austrodanthonia caespitosa	Ringed Wallaby Grass	1		3	AR	
Poaceae	Austrodanthonia carphoides	Short Wallaby Grass			3	AR	
Poaceae	Austrodanthonia duttoniana				3		
Poaceae	Austrodanthonia laevis		1		3		
Poaceae	Austrodanthonia pilosa SS	Smooth-flowered Wallaby Grass				AR	
Poaceae	Austrodanthonia spp.						SS
Poaceae	Austrostipa bigeniculata SS	Tall Speargrass	1	2	3	AR	SS
Poaceae	Austrostipa densiflora SS			2			
Poaceae	Austrostipa scabra ssp. falcata SS	Slender Speargrass	1	2	3	AR	SS
Poaceae	✓ Bothriochloa macra SS	Red Grass, Red-leg Grass	1	2	3	AR	SS
Poaceae	✓ Chloris truncata SS	Windmill Grass	1	1			
Poaceae	✓ Cymbopogon refractus not SS	Barbed Wire Grass		2			
Poaceae	✓ Dichelachne crinita SS	Longhair Plumegrass	1	(2)			
Poaceae	✓ Dichelachne rara SS						SS
Poaceae	✓ Elymus scabrus var. scabrus SS	Common Wheatgrass	1	2	3		SS
Poaceae	✓ Eriopogon nigricans SS	Niggerheads, Nineawn Grass	(1)	2	3	AR	SS
Poaceae	✓ Microlaena stipoides var. stipoides SS	Weeping Grass	1		3		
Poaceae	Panicum effusum SS	Hairy Panic	1		3	AR	SS
Poaceae	✓ Phragmites australis not SS	Common Reed	(1)	2	(3)	AR	
Poaceae	✓ Poa labillardieri SS	Tussock	(1)		3		SS
Poaceae	✓ Poa sieberiana var. sieberiana SS		1	2	3		
Poaceae	(IC 4976)						
Poaceae	Sporobolus elongatus not SS	Rat's-tail Grass	(1)	(2)		AR	
Poaceae	✓ Themeda australis SS	Kangaroo Grass	1	2	3	AR	SS

\*Setaria (pumila?) pale green grass

S creber? SS

on blank page opposite:

"tall chloromelas (tall lovegrass)

Digitaria brownii  
(cotton panic grass)

28 exotic grasses

25 native grasses

Sorghum leiocladum (wild sorghum) - a native perennial in area 1 southern beach -

family	scientific name	common name	1	2	3	AR	SS
Polygonaceae	✓* <i>Acetosella vulgaris</i>	SS Sorrel, Sheep Sorrel	1	2	3		SS
Polygonaceae	✗* <i>Polygonum aviculare</i>	not SS Wireweed			3		
Polygonaceae	✓* <i>Rumex crispus</i>	SS Curled Dock		2	3		
Polygonaceae	✓ <i>Persicaria prostrata</i>	not SS Creeping Knotweed			3		
Polygonaceae	G { <i>Rumex brownii</i>	SS Slender Dock	1	2	3		
Polygonaceae	G { <i>Rumex dumosus</i>	SS Wiry Dock	1				SS
Primulaceae	✗* <i>Anagallis arvensis</i>	not SS Scarlet Pimpernel			3		
Proteaceae	✗ <i>Grevillea</i> sp. p	not SS			3		
Proteaceae	6 { <i>Hakea eriantha</i> p	not SS	1				
Proteaceae	6 { <i>Hakea salicifolia</i> p	not SS	1				
Rhamnaceae	✓ <i>Cryptandra amara</i> ssp. ?	SS	①			AR	SS
Rosaceae	✓* <i>Cotoneaster glaucophyllus</i>	not SS (IC 5507)		2	3	AR	
Rosaceae	✓* <i>Crataegus monogyna</i>	not SS Hawthorn				AR	
Rosaceae	✓* <i>Prunus armeniaca</i>	not SS Apricot		2		AR	
Rosaceae	✓* <i>Pyracantha angustifolia</i>	not SS Pyracantha	1	2		AR	
Rosaceae	✓* <i>Rosa rubiginosa</i>	not SS Sweet Briar	1	2		AR	
Rosaceae	✓* <i>Rubus fruticosus</i> spp. agg.	not SS Blackberry		2			SS ? not found
Rosaceae	* <i>Sanguisorba minor</i> ssp. <i>muricata</i>	SS Sheep's Burnet	1	2	3		SS
Rosaceae	✓ <i>Acaena echinata</i> (ovine?)	SS Sheep's Burr	1	2	3		SS
BT → Rosaceae	✓ <i>Rubus parvifolius</i>	not SS Native Raspberry				AR	? not found
Rubiaceae	6 { <i>*Galium aparine</i> (IC 4974)	not SS Cleavers, Goosegrass		2	3		
Rubiaceae	6 { <i>Asperula conferta</i>	SS Common Woodruff	1		3		SS
Rubiaceae	6 { <i>*Galium gaudichaudii</i>	SS Rough Bedstraw		2			
Salicaceae	✓* <i>Salix alba</i> (IC 5526, 28)	not SS White Willow		2			
Salicaceae	✓* <i>Salix babylonica</i>	not SS Weeping Willow		2		AR	
Salicaceae	✓* <i>Salix fragilis</i>	not SS Crack Willow				AR	
Sapindaceae	<i>Dodonaea viscosa</i> ssp. <i>angustissima</i> (IC 5508)	not SS a Hopbush		2			
Scrophulariaceae	* <i>Linaria arvensis</i>	SS		2	3		
Scrophulariaceae	* <i>Linaria pelisseriana</i>	SS Pelisser's Toadflax	1	2	3		
Scrophulariaceae	* <i>Parentucellia latifolia</i>	SS Red Bartsia	1	2			
Scrophulariaceae	6 { <i>*Verbascum thapsus</i> ssp. <i>thapsus</i>	SS Blanket Weed	①	2	③		
Scrophulariaceae	6 { <i>*Verbascum virgatum</i>	SS Twiggly Mullein	1	2			
Sinopteridaceae	<i>Cheilanthes austrotenuifolia</i>	SS Rock Fern	1			AR	SS
Sinopteridaceae	<i>Cheilanthes sieberi</i> ssp. <i>sieberi</i>	SS Narrow Rock-fern	1	2			SS
Sinopteridaceae	<i>Pellaea falcata</i> ssp. <i>falcata</i>	not SS Sickle Fern				AR	
BT { Typhaceae	✗ <i>Typha domingensis</i>	} not SS				3	
Typhaceae	6 { <i>Typha orientalis</i>						AR
Verbenaceae	✗* <i>Verbena bonariensis</i>	not SS Purpletop			3	AR	
Violaceae	✓* <i>Viola odorata</i> (IC 5509)	not SS Sweet Violet		2		AR	

~~*Asperula scoparia*~~ → SS  
 Melichrus urceolatus ??  
 urn Heath ①  
 probably star wright  
 woodru #10  
 Umbagog District Park vi 2000. Australian Botanical Surveys.  
 Nick Webb's identification

#### 4. ANIMAL SPECIES RECORDED IN UMBAGONG DISTRICT PARK 1992-99.

In this 1998-99 survey, no effort was made to survey fauna. Only species observed in the course of recording plants have been added to the list. Observer names are abbreviated as follows:

- IC Isobel Crawford
- RC Robert Cruickshank
- PO Peter Ormay
- AR Alison Rowell

##### 4.1. Invertebrates

No survey has been conducted of the invertebrate fauna at Umbagog, but the following incidental observations have been recorded:

- Leeches in the class Hirudinea, order Arhynchobdellida: noted by RC 13 xii 1997 to be present following prolonged disturbance of the water.
- Dragonflies, in the insect order Odonata, observed 'over both swamps' by (Rowell 1993) were upstream from the area surveyed for this report.

No habitat suitable for the endangered Golden Sun Moth *Synemon plana* was found (Rowell 1993; Crawford pers. obs.). Although Rowell (1993) found habitat suitable for Key's Matchstick *Keyacris scurra* in the Kangaroo Grass and Yellow Buttons of the Blue Devil Grassland, none were recorded then and none since.

##### 4.2 Crustaceans and fishes

A Yabby *Cherax destructor* claw was recorded by Rowell (1993) and holes by IC on 14 xi 1998.

Three fish species were recorded by Rowell (1993):

- Goldfish *Carassius auratus*;
- Mosquitofish *Gambusia affinis*; and
- Oriental Weatherloach *Misgurnus anguillicaudatus*.

##### 4.3 Frogs

Names follow Bennett (1997). The Peter Ormay records are from the Wildlife Research and Monitoring permanent frog monitoring site on Kippax Creek, 50 m. above the cycle bridge and confluence with Giminderra Creek. Four frog species have been recorded:

- Common Eastern Froglet *Crinia signifera* [Rowell (1993); IC 14 xi 1998];
- Plains Froglet *C. parinsignifera* [Rowell (1993); IC 14 xi 1998];
- Eastern Banjo Frog *Limnodynastes dumerilii* [Rowell (1993); RC 'all along the creek' 26 ix 1995; via RC 16 xi 1996; PO 5-20 individuals 21 xi 1997; IC 20 viii 1999; PO 1-5 individuals 23 xi 1999]; and
- Spotted Grass Frog *L. tasmaniensis* [Rowell (1993); PO 1-5 individuals 21 xi 1997; IC 14 xi 1998; PO 1-5 individuals 23 xi 1999].

#### 4.4 Reptiles

Names and order follow Bennett (1997). The following five large reptile species have been recorded, and there are doubtless some small brown skink species waiting to be added to the list:

- Common Long-necked Tortoise *Chelodina longicollis* [RC Kippax Ck 8 xii 1996; IC shell 14 xi 1998];
- Cunningham's Skink *Egernia cumminghami* [Rowell (1993); RC 25 ix 1996; IC 14 xi 1998];
- Gippsland Water Dragon *Physignathus lesueurii howittii* [via RC 16 xi 1996; RC 15 xi 1997, 20 xii 1997, 24 xii 1997, 26 xii 1997 dead, 24 i 1998, 15 iii 1998 young individual, and 21 iii 1998];
- ?Shingleback *Trachydosaurus rugosus* [RC NE corner in scree 25 xi 1996];
- Common or Eastern Brown Snake *Pseudonaja textilis* [pers. comm. R. Bennett in Rowell (1993); IC skin 14 xi 1998].

#### 4.5 Birds

Names and systematic order follow Christidis & Boles (1992).

**Table 2. Bird species recorded in Umbagog District Park 1992-99.**

scientific name	common name
Pacific Black Duck	<i>Anas superciliosa</i>
Little Pied Cormorant	<i>Phalacrocorax melanoleucos</i>
White-faced Heron	<i>Egretta novaehollandiae</i>
Black-shouldered Kite	<i>Elanus axillaris</i>
Brown Goshawk	<i>Accipiter fasciatus</i>
Nankeen Kestrel	<i>Falco cenchroides</i>
Galah	<i>Cacatua roseicapilla</i>
Crimson Rosella	<i>Platycercus elegans</i>
Red-rumped Parrot	<i>Psephotus haematonotus</i>
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>
Laughing Kookaburra	<i>Dacelo novaeguineae</i>
Sacred Kingfisher	<i>Todiramphus sanctus</i>
Dollar bird	<i>Eurystomus orientalis</i>
Superb Fairy-wren	<i>Malurus cyaneus</i>
White-browed Scrubwren	<i>Sericornis frontalis</i>
Weebill	<i>Smicromis brevirostris</i>
Buff-rumped Thornbill	<i>Acanthiza reguloides</i>
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>
Yellow Thornbill	<i>Acanthiza nana</i>
Red Wattlebird	<i>Anthochaera carunculata</i>
Noisy Friarbird	<i>Philemon corniculatus</i>
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>
Flame Robin	<i>Petroica phoenicea</i>
Golden Whistler	<i>Pachycephala pectoralis</i>

NB R Summerville  
lest 3 probably  
more  
comprehensive

#### 4.5 Birds (con.)

Table 2. Bird species recorded in Umbagog District Park 1992-99.

Rufous Whistler	<i>Pachycephala rufiventris</i>
Magpie-lark	<i>Grallina cyanoleuca</i>
Grey Fantail	<i>Rhipidura fuliginosa</i>
Black-faced Cuckoo-shrike	<i>Coracina novaeollandiae</i>
Australian Magpie	<i>Gymnorhina tibicen</i>
Pied Currawong	<i>Strepera graculina</i>
Australian Raven	<i>Corvus coronoides</i>
Richard's Pipit	<i>Anthus novaeseelandiae</i>
House Sparrow	<i>Passer domesticus</i>
Double-barred Finch	<i>Taeniopygia bichenovii</i>
Red-browed Finch	<i>Neochmia temporalis</i>
European Goldfinch	<i>Carduelis carduelis</i>
Welcome Swallow	<i>Hirundo neoxena</i>
Clamorous Reed-Warbler	<i>Acrocephalus stentoreus</i>
Silvereye	<i>Zosterops lateralis</i>
Common Blackbird	<i>Turdus merula</i>
Common Starling	<i>Sturnus vulgaris</i>

#### 4.6 Mammals

Names and order follow Strahan (1995). Six species of large mammals have been recorded, and bats and other smaller species such as Black Rat *Rattus rattus*, Brown Hare *Lepus capensis* and Rabbit *Oryctolagus cuniculus* could be recorded if more work were done, especially at dawn and dusk and night. The herbivore recorded 12 x 1994 by RC near the right bank of Kippax Creek was probably an Eastern Grey Kangaroo *Macropus giganteus* rather than a Swamp Wallaby *Wallabia bicolor*. RC also recorded a 'long-tailed mouse in Kippax Creek' 25 ii 1994, which is most likely to have been either a Black Rat *Rattus rattus*, described as 'a good swimmer' by Watts (1995), or a Water-rat *Hydromys chrysogaster*.

- Common Wombat *Vombatus ursinus* [RC 16 xi 1996; IC droppings 20 viii 1999];
- Water-rat *Hydromys chrysogaster* [RC 1991; Rowell (1992, 1993)];
- House Mouse *Mus musculus* [Rowell (1992)].
- Dog *Canis familiaris familiaris* ['a large number, supervised and unsupervised' Rowell (1992); RC chasing fox 26 vii 1995; IC attacked by dog 29 ix 1999].
- Fox *Vulpes vulpes* [RC 26 vii 1995; RC dead fox 15 ix 1995; RC 16 xi 1996; IC 20 viii 1999];
- Cat *Felis catus* [Rowell (1992)].

• Swamp wallaby (occasional)  
 • eastern grey (occasional)

## 5. COMPARISON WITH OTHER NEARBY AREAS

The best studied area nearby is the Belconnen Naval Station, c. 7 km upstream on Ginninderra Creek, and so a comparison with the vegetation there seems pertinent, allowing for the fact that the Naval Station covers 140 ha, i.e. about twice the size of the whole of Umbagog District Park and c. 20 times larger than the Blue Devil Grassland and environs surveyed for this report. The best quality vegetation on the Naval Station is better than the Blue Devil Grassland by virtue of the higher number of native species, the greater cover of native species and the obverse of this, the lower cover of introduced species. These factors are usually directly related to the size of a patch of remnant vegetation, so it is not surprising that the larger area has retained better quality vegetation, at least until grazing ceased there in the late 1990s.

This does not mean that the Blue Devil Grassland is not worth retaining as public open space, but rather that public money should be directed to the restoration of this grassland. It is not fair to expect this sort of complex ecological restoration and management work to continue to be undertaken gratis by private individuals of good will. This is a public responsibility and should be funded publicly.

The nearby University of Canberra may be interested in using the Blue Devil Grassland as a study area to compare the effects of different burning and mowing treatments on the density and extent of introduced weed species, especially the Wild Oats *Avena* species.

## 6. MANAGEMENT ISSUES AND RECOMMENDATIONS

### 6.1 Management issues and the responses to them

Three of the most important management issues are:

- the reduction of herbaceous (i.e. grasses and other herbs) plant biomass by burning and mowing;
- weeds; and
- rock removal which destroys animal habitat and may facilitate erosion.

As the planted eucalypts become older and larger, removal of fallen dead branches is likely to become an issue too (as this removes habitat for invertebrates and smaller vertebrates such as frogs, reptiles, birds and mammals).

#### 6.1.1 Reduction of plant biomass

Grasses have evolved to cope with being eaten repeatedly, and the loss or removal of the principal herbivores (in this area macropods such as kangaroos, and, more recently, domestic stock), as has happened at Umbagog and elsewhere, leads to a dense growth of smothering grasses. This in turn discourages the growth of other smaller herbaceous species and their eventual loss from the grassland. Burning and [slashing or mowing] are the most commonly used substitutes for native herbivore grazing, and both are currently employed to reduce plant biomass in the Blue Devil Grassland.

Burning for conservation purposes is done every three years under the direction of ACT Wildlife Research and Monitoring. Such conservation burns have been done in October 1994



### 6.1.1 Reduction of plant biomass (con.)

and autumn 1997. In late June 2000 an accidental burn occurred, before the planned one, delayed by wet conditions, could be effected. *mid - to early June*

Mowing/slashing: the whole site was mown more or less regularly up to 1994, but now only a 3 m strip either side of tracks is mown, and a 20-30 m strip along the fences. ?

There is scope for experimenting with the season and frequency of burning/slashing to manage the population of Wild Oats, one of the most common weeds of the Blue Devil Grassland. \*

### 6.1.2 Environmental weeds

These fall into two main categories, woody plants such as Willows, Privets, Honeysuckle, Ivy, Cotoneasters and Pyracanthas, and herbaceous species such as Wild Oats (annual), Paterson's Curse and many thistle species (biennial) and African Lovegrass, Chilean Needlegrass and Violets (perennial). They are most commonly spread by 'escaping' from gardens, by birds, and by the dumping of garden rubbish on public land.

As noted above, the most visible common weed of the Blue Devil Grassland is Wild Oats. African Lovegrass is present above the bridge across Kippax Creek, and Serrated Tussock and Chilean Needlegrass occur west of this Creek. I consider these perennial grasses to present the greatest threat to the Grassland, as they can spread so rapidly, facilitated by mowing. Woody weeds are more common in the damper soils along the creek. The Willow population is gradually being cut and poisoned (Nicholson 2000). This is likely to result in a dense growth of seedlings of other environmental weeds, with the great increase in light reaching the ground in the summer. These will in turn need to be controlled. The gross pollutant trap on Kippax Creek is encouraging the growth of weeds, as it concentrates nutrients, and most weed species thrive in such conditions, as is apparent from a survey of the Creek below the trap.

wild oats  
african  
love grass  
serrated  
tussock  
chilean  
needlegrass

Rowell (1992) noted the importance of not planting trees and shrubs on grassland. This degrades the quality and extent of native grassland by increasing shading, which in turn discourages true grassland species which require high light levels.

The following techniques have been employed to control weeds in the Blue Devil Grassland:

- hand weeding by volunteers of African Lovegrass, Paterson's Curse and St John's Wort;
- introduction of a biological control insect, the Seedhead Weevil *Larimus lautus*, to the St John's Wort. This beetle now seems to have died out, and the St John's Wort along Kippax Creek has been spot sprayed.

### 6.1.3 Rock removal

Above the creek Rowell (1992) noted the lack of rocks 'small enough for one person to turn' and suggested that this was probably caused by rock removal by gardeners. This is a very important issue in public land in and around towns, where loose surface rock of this size has largely been removed.

It appears that no actions have yet been taken to address this problem.

## 6.2 Management recommendations

### 6.2.1 Biomass reduction

- Continue the present policy of burning all of the Blue Devil Grassland every three years, but amend it so that part of it is burnt each year or two, leaving the remainder unburned to provide shelter for any remaining native grassland animals (*i.e.* patch burn).
- Make contact with the University of Canberra School of Applied Science and the ANU Department of Botany and Zoology to devise a project to compare the results of varying the season and frequency of burn to manage Wild Oats in the Blue Devil Grassland.
- Burn Kangaroo Grass patch east of Florey Drive, between numbers 9 and 13, preferably in late winter to try to reduce the density of introduced annual herbs and rejuvenate the Kangaroo Grass.
- Burn Kangaroo Grass patch south of the Creek below the sewer pipe.
- Insist on cleaning of mower/slasher off site prior to being used on the Blue Devil Grassland, to minimise the chance of introducing new species of weeds. This should be written into the mowing contract for this site, and extra funds be made available to allow for the time required to do this properly.
- The Blue Devil Grassland should be mown first (*i.e.* before the remainder of the Park), to minimise the chance of introducing new weeds or spreading existing ones. Mown material should be removed to lessen the build-up of nutrients from dumped biomass. (It could be used as mulch around tree and shrub plantings elsewhere in the Park).

residents?

?

residents?

residents?

very unlikely!!

ditto.

### 6.2.2 Weeds

This section is divided into:

- i) a description of the Bradley method of regeneration, recommended as an ecologically sensible way to weed;
- ii) a series of recommendations for treating woody species, annual herbaceous species and biennial and perennial species;
- ii) a series of particular recommendations to minimise the likelihood of new weed species being introduced, and slow the spread of existing ones.

These recommendations go from the general to the particular.

#### 6.2.2 i Bradley method

It is recommended that the Bradley method of regeneration be employed on this site (Bradley 1988) to gain the best long-term results. A copy of this publication is appended for use by the Umbagog Landcare Group (Appendix 2). Although it was devised for forest on the Hawkesbury Sandstone, its principles are equally valid for grassland vegetation. The three basic principles are:

- i) work outwards from areas with native plants towards weed-infested areas;
- ii) make minimal disturbance to the environment; and
- iii) do not 'over clear'.

Each is elaborated in turn.

### 6.2.2 i Bradley method (con.)

*Principle 1: Work outwards from areas with native plants towards weed-infested areas*

This is based on the fact that native plant species can regain ground inhabited by weeds, if the weeds are removed with minimum disturbance and at the rate at which the native species can regenerate. Weeding a little at a time from the less disturbed areas to the weedier takes the pressure of the competing weeds off the native species. Seeds and spores of native species are present in the soil, and the environment favours the species that have evolved in it. The balance is tipped towards regeneration of the native species.

*Principle 2: Make minimal disturbance*

Disturbance increases the level of soil nutrients and so, generally, favours introduced species which have evolved in higher nutrient soils. It also lays bare the soil and so favours colonising species able to take advantage of bare ground. Therefore, remove weeds as carefully as possible, and replace any mulch or soil removed to reduce the likelihood of more weeds germinating and replacing the one removed.

*Principle 3: Do not 'over clear', i.e. let the rate of native plant regeneration dictate the rate of weed removal.*

The less weedy a patch is, the greater the area of it that can profitably be weeded at any one time. Regeneration of native species slows down as the weeds become denser, and the weeding rate should therefore be slowed to match. If weeding is done at a rate faster than the native species are able to regenerate and spread, the energy spent in such weeding is wasted, and those doing the work are likely to become demoralised.

### 6.2.2 ii Treatment of weeds

- **Woody weeds:** cut and dab stems with glyphosate, following product directions for Privet *\*Ligustrum lucidum* and *\*L. sinensis*, Pyracantha *Pyracantha* spp., Sweet Briar *\*Rosa rubiginosa* and Blackberry *\*Rubus fruticosus*. Herbicide should be applied immediately following cutting to maximise the uptake of poison. Seedlings of all woody weed species should be carefully and completely removed wherever chanced upon on the site.
- Repeated cutting above ground of stems (before flowers start to set seed) is reputed to weaken and eventually kill mature plants of St John's Wort *\*Hypericum perforatum*, so this method is recommended, in conjunction with careful uprooting of whole small plants following rain.
- Removal of material: all material should be removed carefully from the site, to minimise the chance of seeds or cut stems producing new plants.
- **Annual herbaceous weeds:** larger species such as Wild Oats *\*Avena* spp. and the Bromes (*\*Bromus diandrus*, *B. molliformis*) should be cut above ground and removed before flowering.

#### 6.2.2 ii Treatment of weeds (con.)

- Perennial and biennial herbaceous weeds (e.g. Salvation Jane *\*Echium plantagineum*, Salsify *\*Tragopogon* spp.) are best removed following rain. If this is done at the seedling stage, disturbance to the soil will be minimised.



#### 6.2.2 iii Particular recommendations

- Any planting in the buffer zones around the Blue Devil Grassland (i.e. areas 2 and 3) should be of local native species instead of non-local, as the latter are more likely to become weedy.
- Continue the poisoning of Large-leaved Privet, Cotoneaster and other environmental weeds in and near the Creek.
- Erect a number of signs *no dumping of building or garden rubbish*, and explain why (increased level of nutrients favouring weeds, out-competing native species). Such a sign would be particularly well placed opposite no. 25 Florey Drive as all the plant species damaged in the Park across the road were recorded in this garden, on 20 viii 1999.
- The mown strip either side of the path through the Blue Devil Grassland should be weeded by hand and/or spot sprayed by weeders familiar with all the species of weedy grasses, to minimise the likelihood of their being further spread.



#### 6.2.3 Rock removal

Signage should be erected to explain the importance of rocks as animal and plant habitat, and asking that rocks not be removed. Suggest sub-soil rock be used instead.