

THE VASCULAR PLANTS OF FIVE EXCLOSURE SITES IN WESTERN NEW SOUTH WALES

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ABSTRACT

Cunningham, G. M. & Milthorpe, P. L. (*Soil Conservation Service of New South Wales, Condobolin, New South Wales, Australia 2877*) 1981. *The vascular plants of five exclosure sites in western New South Wales. Cunninghamia 1 (1): 23-34.* A list of 401 species representing 61 families and 91 genera was recorded from five exclosure sites in semiarid western New South Wales. Any plants that could not be identified by the authors in the field were collected and determined at the National Herbarium of New South Wales. Duplicates of these specimens are housed at the Soil Conservation Office at Condobolin. Fifty-five naturalized species, mainly from the families Poaceae, Asteraceae, Fabaceae and Brassicaceae, were recorded. Several native species that are rare in the region were also found in the exclosures. A brief description of the exclosure sites is presented.

INTRODUCTION

Soil conservation in the arid and semiarid sections of New South Wales is vitally linked with rangeland management. Proper range management is dependent on a thorough knowledge of the vegetation as well as an understanding of the changes which occur with grazing, exclosure or other management manipulations. Although the arid and semiarid rangelands of western New South Wales have been grazed for between 110 and 140 years there has been very little formalization of range management.

During the early 1950's the Soil Conservation Service of New South Wales set up a series of exclosures at sites adjacent to the transcontinental railway line between Condobolin and the Darling River in western New South Wales. An additional exclosure was fenced at Cobar in 1963 as a site for revegetation trials.

These exclosures were originally established to study erosion and natural reclamation as well as to evaluate reclamation techniques and for ecological studies. The areas represent some of the more erosion susceptible land types in western New South Wales. As well as meeting these stated needs, the exclosures have, over the years, provided sites for botanical collection to determine the richness of the species assemblage within the different vegetation communities under conditions where domestic livestock grazing was excluded. Details of the size, location, year established, soils and vegetation communities of these exclosures are contained in Table 1 and their location can be seen in Figure 1.

We know little of the species which comprise each vegetation community under grazing, let alone prior to grazing. However, Beadle (1948) attempted to list the species which occurred in the major vegetation communities.

While it may never be possible nor desirable to return to the pre-domestic grazing situation, since there have doubtless been many irreversible soil and vegetation changes, there is much value in recording the present species assemblage to provide a reference point for the future.

The list (Table 2) presented here is an initial attempt to describe the species assemblage at each site in the hope that it will provide a basis for future ecological studies of these communities.

TABLE 1
Details of the five exclosures

Exclosure	Year fenced	Mean annual rainfall (mm)	Location	Area (ha)	Topography, soils	Vegetation
Cobar	1963	360	11 km south of Cobar 145° 53' E, 31° 35' S	81	Undulating (to 3% slope) gravelly ridges; uniform (skeletal) and gradational (red earth) soils.	Open woodland of mulga (<i>Acacia aneura</i>) ironwood (<i>Acacia excelsa</i>), bimbie box (<i>Eucalyptus populnea</i>), red box (<i>Eucalyptus intertexta</i>) and white cypress pine (<i>Callitris columellaris</i>). Clumps of shrubs (mainly <i>Eremophila spp.</i>) and white cypress pine regrowth. Open grassland, few bimbie box (<i>Eucalyptus populnea</i>), white cypress pine (<i>Callitris columellaris</i>), yarran (<i>Acacia homalophylla</i>). Dense regeneration of white cypress pine on some sections.
Booberoi	1950	380	64 km west of Condobolin on Booberoi Station 146° 30' E, 33° 02' S	120	Generally level red brown earths; small gravelly rise; large areas of scald and reclaimed scald.	Initially completely bare. Now substantially covered by a dense bladder saltbush (<i>Atriplex vesicaria</i>) and old man saltbush (<i>A. nummularia</i>) community.
Micabil	1952	410	21 km west of Condobolin 146° 57' E, 33° 05' S	12	Level to slightly undulating (1% slope) scalded clay surfaces; salt crusted heavy grey clays; scalded level to slightly undulating duplex soils with exposed smooth and gravelly scalds.	Black bluebush (<i>Maireana pyramidata</i>) and bladder saltbush (<i>Atriplex vesicaria</i>) communities with belah (<i>Casuarina cristata</i>), rosewood (<i>Heterodendrum oleifolium</i>) and nelia (<i>Acacia loderi</i>) clumps.
Sayers Lake	1952	230	88 km west of Ivanhoe and 2 km west of Manara railway siding. 143° 24' E, 32° 48' S	421	Slightly undulating (to 2% slope); generally sandy surfaced soils with either duplex red brown earth or gradational profiles. Some severe scald and reclaimed scald.	Open bladder saltbush (<i>Atriplex vesicaria</i>) plains with cotton bush (<i>Maireana aphylla</i>), lignum (<i>Muehlenbeckia cunninghamii</i>), and nitre goosefoot (<i>Chenopodium nitrariceum</i>) communities. Clumps of swamp box (<i>Eucalyptus largiflorens</i>).
Trida	1950	320	9 km west of Trida railway siding. 144° 56' E, 33° 00' S	567	Generally level heavy grey self-mulching clays; firm, compact grey and brown clays and scalded duplex soils.	

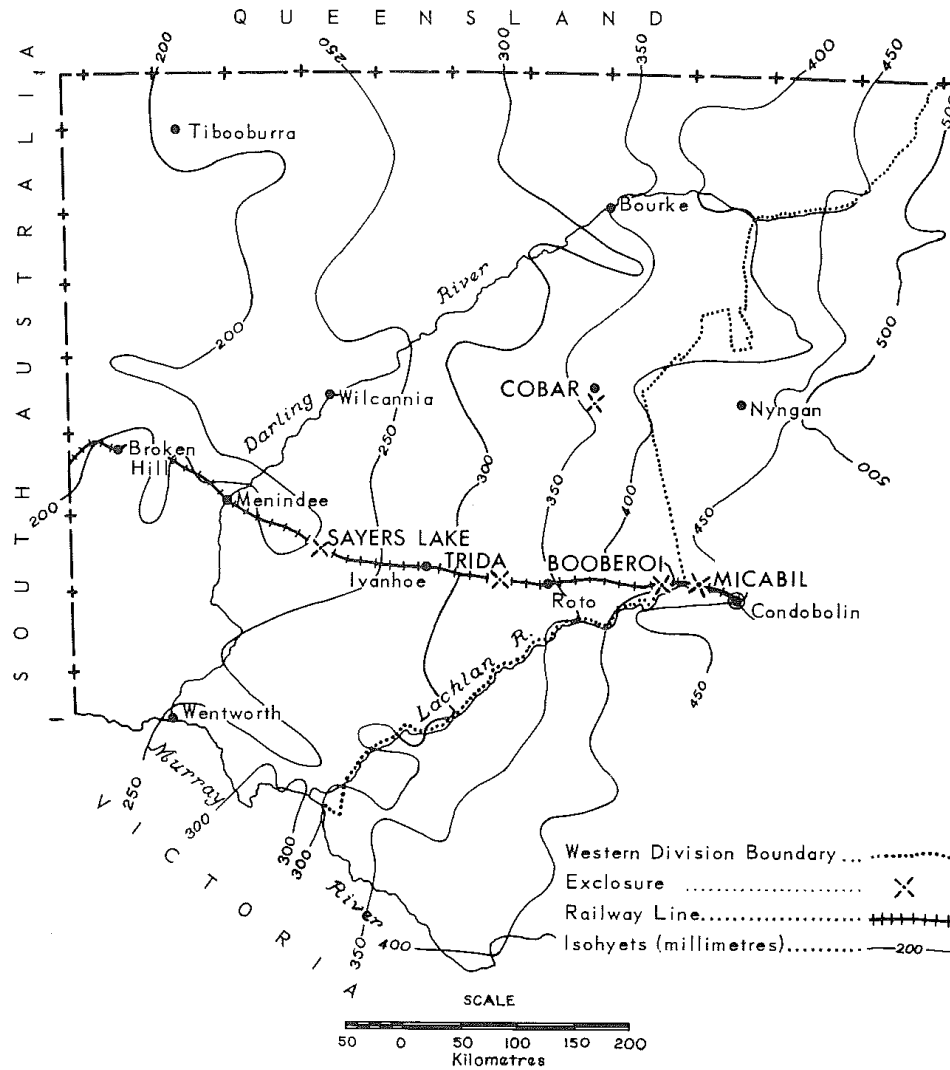


Figure 1. The western half of New South Wales showing the location of the five enclosures and the rainfall isohyets.

THE LIST AND ITS ARRANGEMENT

Most of the specimens at each enclosure were identified in the field but unusual specimens were sent to the National Herbarium for identification. Obviously there are disadvantages in not having voucher specimens to verify all identifications but the time involved in collecting easily recognisable species and having them identified, combined with the problems of specimen mounting and storage, dictated against collecting voucher specimens when positive field identification was possible.

Collection of data was carried out at the Cobar site between 1963 and 1976, while all other areas were visited between 1973 and 1976. Most collections were made in spring, although some visits were made at other times. We do not, however, claim that our collections at each site are exhaustive.

For convenience of reference, species are shown in alphabetical order within families, which are in turn arranged alphabetically. The family, generic and specific names are those currently in use at the New South Wales National Herbarium. Exotic species, marked with an asterisk (*), have been included only when they have been naturalized in the area and are capable of reproduction and persistence in the natural environment.

TABLE 2

Species recorded at the five exclosures

* = introduced species.

x = species identified from exclosure.

Botanical name	Booberoi	Cobar	Micabil	Sayers Lake	Trida
PTERIDOPHYTES					
Marsileaceae					
<i>Marsilea drummondii</i> .. .. .	..	..	X	X	X
Ophioglossaceae					
<i>Ophioglossum lusitanicum</i> subsp. <i>coriaceum</i> .. .. .	..	X	..	..	..
Polypodiaceae					
<i>Cheilanthes tenuifolia</i>	X	X	X	..	..
GYMNOSPERMS					
Cupressaceae					
<i>Callitris columellaris</i>	X	X	..	..	..
ANGIOSPERMS					
DICOTYLEDONS					
Aizoaceae					
<i>Tetragonia eremaea</i> .. .. .	..	..	..	X	..
<i>T. tetragonioides</i> .. .. .	..	..	..	X	X
<i>Zaleya galericulata</i>	X	..	..	..	..
Amaranthaceae					
<i>Alternanthera augustifolia</i>	X	..	..	..	X
<i>A. denticulata</i>	X	..	..	X	..
<i>A. nodiflora</i> .. .. .	..	..	..	X	..
<i>Amaranthus macrocarpus</i> .. .. .	..	..	..	..	X
<i>A. sp. (undescribed)</i> .. .. .	..	X	..	..	..
<i>Ptilotus atriplicifolius</i> .. .. .	..	X	..	..	..
<i>P. exaltatus</i> .. .. .	..	X	..	..	..
<i>P. gaudichaudii</i> var. <i>parviflorus</i>	..	X	..	..	..
<i>P. nobilis</i> .. .. .	..	..	..	..	X
<i>P. obovatus</i>	X	X	..	X	..
Apiaceae					
<i>Daucus glochidiatus</i>	X	X	X	X	X
Asteraceae					
<i>Actinobole uliginosum</i>	X	X	..	..	..
<i>Angianthus strictus</i>	X	..	..	..	..
<i>A. tomentosus</i> .. .. .	..	..	..	..	X
* <i>Arctotheca calendula</i>	X	..	X	..	..
* <i>Aster subulatus</i> .. .. .	..	..	X	..	..
<i>Brachycome ciliaris</i> .. .. .	..	..	X	X	..
<i>B. goniocarpa</i> .. .. .	..	..	..	..	X
<i>B. lineariloba</i>	X	X	X	X	X
<i>B. marginata</i> .. .. .	..	X	..	X	..
<i>Calocephalus citreus</i>	X	..	..	..	..
<i>C. sonderi</i> .. .. .	..	..	X	..	X
<i>Calotis cuneifolia</i> .. .. .	..	X	..	..	..
<i>C. cymbacantha</i> .. .. .	..	..	..	X	..
<i>C. hispidula</i>	X	X	..	X	X
<i>C. lappulacea</i> .. .. .	..	X	..	..	..
<i>C. multicaulis</i> .. .. .	..	..	..	X	..
<i>C. scabiosifolia</i> var. <i>integrifolia</i>	..	..	..	X	..
<i>C. scabiosifolia</i> var. <i>scabiosifolia</i>	X	..	..	..	..
* <i>Carthamus lanatus</i>	X	X	X	..	..
<i>Cassinia laevis</i> .. .. .	..	X	..	..	..
* <i>Centaurea melitensis</i>	X	X	..	X	X
<i>Centipeda cunninghamii</i> .. .. .	..	X	..	..	X
<i>C. minima</i> .. .. .	..	..	..	..	X
<i>C. thespidioides</i>	X	..	..	X	X

Botanical name	Booberoi	Cobar	Micabil	Sayers Lake	Trida
* <i>Chondrilla juncea</i>	..	X	..	..	..
<i>Chthonocephalus pseudevax</i>	X	..	..	..	..
* <i>Conyza bonariensis</i>	..	..	X	..	..
<i>Craspedia chrysantha</i>	..	..	..	..	X
<i>C. pleiocephala</i>	..	..	..	X	..
<i>Eclipta platyglossa</i>	..	..	X	..	..
<i>Epaltes cunninghamii</i>	..	..	..	X	..
<i>Gnaphalium luteo-album</i>	..	..	..	X	X
<i>G. sphaericum</i>	X	..	..	X	X
<i>Gnaphalodes condensatum</i>	..	X	..	..	..
<i>Gnephosis foliata</i>	..	..	..	..	X
* <i>Hedychnois rhagadioloides</i> subsp.					
<i>cretica</i>	X	X	..	..	..
<i>Helichrysum apiculatum</i>	X	X	X	..	..
<i>H. bracteatum</i>	X	X	X	..	X
<i>H. semipapposum</i>	..	X	..	..	..
<i>Helipterum australe</i>	X	X	X	..	..
<i>H. corymbiflorum</i>	X	..	X	X	X
<i>H. floribundum</i>	X	X	..	X	X
<i>H. moschatum</i>	..	..	..	X	..
<i>H. polygalifolium</i>	..	..	..	X	..
<i>H. pygmaeum</i>	X	X	..	X	..
* <i>Hypochaeris radicata</i>	X	X	X	..	..
<i>Isoetopsis graminifolia</i>	X	X	..	..	..
<i>Ixiolaena leptolepis</i>	..	..	..	X	X
<i>I. tomentosa</i>	..	..	..	..	X
* <i>Lactuca serriola</i>	X	..	..	..	..
<i>Leptorhynchos panaetioides</i>	X	..	X	..	X
<i>Minuria cunninghamii</i>	X	..	X	X	X
<i>M. denticulata</i>	X	..	X	X	X
<i>M. integerrima</i>	..	..	..	X	X
<i>M. leptophylla</i>	X	X	..	..	..
<i>Myriocephalus rhizocephalus</i>	X	..	..	..	..
<i>Olearia pimeleoides</i>	..	X	..	..	..
<i>Rutidosia helichrysoides</i>	..	X	..	..	..
<i>Senecio glossanthus</i>	X	..	..	X	..
<i>S. lautus</i>	..	..	..	..	X
<i>S. quadridentatus</i>	..	X	..	..	..
<i>S. runcinifolius</i>	..	..	..	..	X
* <i>Sonchus oleraceus</i>	X	X	X	X	X
<i>Stuartina muelleri</i>	X	..	..	..	..
<i>Vittadinia</i> sp. A	..	..	..	..	X
<i>V. triloba</i>	X	X	X	X	X
<i>V. cuneata</i>	..	X	..	..	..
Boraginaceae					
* <i>Echium plantagineum</i>	X	X	X	X	X
<i>Omphalolappula concava</i>	..	..	..	X	..
<i>Plagiobothrys plurisepaleus</i>	X	..	..	..	..
Brassicaceae					
<i>Arabidella</i> sp. aff. <i>glaucescens</i>	..	X	..	..	..
<i>A. trisecta</i>	..	X	..	X	..
* <i>Brassica tournefortii</i>	..	..	..	X	..
<i>Cuphonotus humistratus</i>	X	X	..	..	..
<i>Lepidium fasciculatum</i>	X	..	X	..	X
<i>L. hyssopifolium</i>	X	X	X	..	..
<i>L. rotundum</i>	..	..	..	X	..
<i>L. sagittulatum</i>	..	..	X	..	..
<i>Phlegmatospermum cochlearinum</i>	..	..	..	X	..
* <i>Rapistrum rugosum</i>	..	..	..	X	..
* <i>Sisymbrium altissimum</i>	X	..	..	..	..
* <i>S. irio</i>	X	..	..	..	X

Botanical name	Booberoi	Cobar	Micabil	Sayers Lake	Trida
* <i>S. monoplocoides</i>	X	..	..	..	..
* <i>S. orientale</i> .. .. .	..	X	X	..	X
<i>Stenopetalum</i> sp. .. .. .	..	X	..	..	..
Caesalpiniaceae					
<i>Cassia eremophila</i>	X	X	..	X	..
<i>C. helmsii/artemisioides</i> (intergrading population) .. .. .	..	..	..	X	..
<i>C. phyllodinea</i> .. .. .	..	..	..	..	X
Campanulaceae					
<i>Wahlenbergia communis</i>	X	..	..	X	..
<i>W. gracilis</i> .. .. .	..	..	X	..	..
<i>W.</i> sp. (undescribed)	X	..	..	..	..
<i>W.</i> sp. aff. <i>communis</i>	X	..	..	..	X
<i>W.</i> sp. (undescribed) .. .. .	..	..	X	..	..
Capparidaceae					
<i>Apophyllum anomalum</i> .. .. .	..	X	..	..	X
<i>Capparis mitchellii</i> .. .. .	..	X	..	..	..
Caryophyllaceae					
<i>Spergularia rubra</i> sens. lat.	X	..	X	X	X
Casuarinaceae					
<i>Casuarina cristata</i> subsp. <i>pauper</i> .. .. .	..	..	..	X	..
Chenopodiaceae					
<i>Atriplex angulata</i> .. .. .	..	..	..	X	..
<i>A. conduplicata</i> .. .. .	..	..	X	X	X
<i>A. eardleyae</i>	X	..	..	..	..
<i>A. intermedia</i> .. .. .	..	..	..	X	..
<i>A. leptocarpa</i>	X	..	X	X	X
<i>A. limbata</i> .. .. .	..	..	..	X	..
<i>A. lindleyi</i> .. .. .	..	..	X	..	X
<i>A. microcarpa</i>	X	..	..	..	..
<i>A. nummularia</i> .. .. .	..	..	X	..	X
<i>A. pseudocampanulata</i>	X	..	X	X	X
<i>A. semibaccata</i>	X	..	X	X	X
<i>A. spinibractea</i> .. .. .	..	X	..	..	..
<i>A. spongiosa</i> .. .. .	..	..	..	..	X
<i>A. stipitata</i> .. .. .	..	X	..	X	..
<i>A. vesicaria</i> .. .. .	..	..	X	X	X
<i>Babbagia acroptera</i> .. .. .	..	..	X	X	X
<i>Chenopodium anidiophyllum</i> .. .. .	..	X	..	..	..
<i>C. carinatum</i> .. .. .	..	X	..	..	..
<i>C. melanocarpum</i>	X	..	X	..	..
* <i>C. murale</i>	X	..	..	..	..
<i>C. nitrariaceum</i>	X	..	..	X	X
<i>C. pseudomicrophyllum</i> .. .. .	..	X	..	..	..
<i>Dissocarpus biflorus</i> var. <i>biflorus</i> .. .. .	..	..	X	..	X
<i>D. biflorus</i> var. <i>cephalocarpus</i> .. .. .	..	..	..	X	..
<i>D. paradoxus</i> .. .. .	..	..	..	X	..
<i>Enchylaena tomentosa</i>	X	X	..	X	X
<i>Maireana aphylla</i>	X	..	..	X	X
<i>M. appressa</i> .. .. .	..	X	..	X	..
<i>M. brevifolia</i> .. .. .	..	..	X	..	..
<i>M. georgei</i>	X	..	X	X	..
<i>M. humillima</i>	X	X	..	..	..
<i>M. microphylla</i> .. .. .	..	..	X	..	..
<i>M. pentagona</i>	X	..	X	..	..
<i>M. pyramidata</i> .. .. .	..	..	..	X	..
<i>M. sclerolaenoides</i>	X	X	..
<i>M. tomentosa</i>	X	..	X	..
<i>M. triptera</i>	X
<i>M. villosa</i>	X
<i>Malacocera tricornis</i>	X	X	X

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<i>Rhagodia nutans</i>	..	X	X
<i>R. spinescens</i>	..	X	..	X	X
<i>Salsola kali</i>	X	X	X	X	X
<i>Sclerolaena anisacanthoides</i>	X
<i>S. articulata</i>	..	..	..	X	..
<i>S. bicornis</i> var. <i>bicornis</i>	..	..	..	..	X
<i>S. bicornis</i> var. <i>horrida</i>	..	..	..	..	X
<i>S. birchii</i>	..	..	..	X	..
<i>S. calcarata</i>	..	..	..	..	X
<i>S. decurrens</i>	..	..	..	X	..
<i>S. diacantha</i>	..	X	X	X	X
<i>S. divaricata</i>	..	..	..	X	X
<i>S. eriacantha</i>	..	..	..	X	..
<i>S. intricata</i>	..	..	..	..	X
<i>S. intricata</i> (3-spined form)	..	..	..	X	..
<i>S. lanicuspis</i>	..	..	..	X	X
<i>S. muricata</i> (4-spined form)	..	..	..	..	..
<i>S. muricata</i> var. <i>muricata</i>	..	..	X	X	X
<i>S. muricata</i> var. <i>villosa</i>	..	..	..	..	X
<i>S. obliquicuspis</i>	..	..	..	X	..
<i>S. patenticuspis</i>	..	..	..	X	..
<i>S. tricuspis</i>	..	..	X	..	..
<i>S. uniflora</i>	..	..	..	X	..
<i>S. ventricosa</i>	..	..	..	X	..
<i>S. sp. B.</i>	X	..	..	..	X
<i>S. sp.</i>	..	..	X	X	X
<i>Sclerostegia tenuis</i>	..	..	..	X	..
<i>Threlkeldia salsuginosa</i>	..	..	X	..	..
Convolvulaceae					
<i>Convolvulus erubescens</i>	X	X	X	X	X
Crassulaceae					
<i>Crassula sieberana</i>	..	X	X	X	..
Cucurbitaceae					
* <i>Citrullus lanatus</i>	..	..	..	X	..
Euphorbiaceae					
<i>Euphorbia drummondii</i>	X	X	X	X	X
<i>E. eremophila</i>	..	..	..	..	X
Fabaceae					
<i>Lotus cruentus</i>	..	..	..	X	..
* <i>Medicago laciniata</i>	X	X	..	..	..
* <i>M. minima</i>	X	X	..	..	..
* <i>M. polymorpha</i> var. <i>brevispina</i>	..	..	..	X	..
* <i>M. polymorpha</i> var. <i>vulgaris</i>	X	X	X	X	X
* <i>M. sativa</i>	..	..	X	..	..
* <i>M. truncatula</i>	..	X	X	X	X
<i>Swainsona burkittii</i>	..	..	..	X	..
<i>S. microphylla</i> subsp. <i>affinis</i>	..	X	..	..	..
<i>S. murrayana</i>	..	..	..	..	X
<i>S. procumbens</i>	..	..	..	..	X
<i>S. swainsonioides</i>	..	..	..	..	X
* <i>Trifolium arvense</i>	X	..	..	..	..
* <i>T. glomeratum</i>	X	X	X	..	..
* <i>T. tomentosum</i>	X	X	X	..	..
<i>Trigonella suavissima</i>	..	..	..	X	..
* <i>Vicia monantha</i>	..	..	..	X	..
Frankeniaceae					
<i>Frankenia crispa</i>	X	..
<i>F. serpyllifolia</i>	X
Gentianaceae					
<i>Centaurium spicatum</i>	X
* <i>C. tenuiflorum</i>	X

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Geraniaceae ..					
<i>Erodium crinitum</i>	X	X	X	X	..
<i>E. cygnorum</i> subsp. <i>glandulosum</i>	X	X
Goodeniaceae					
<i>Goodenia cycloptera</i>	X	X	..	..	..
<i>G. fascicularis</i>	X	X	X	..	X
<i>G. gracilis</i> .. ..	..	..	..	..	X
<i>G. heteromera</i> .. ..	..	..	..	..	X
<i>G. pinnatifida</i> .. ..	..	X	..	X	..
<i>G. pusilliflora</i> .. ..	..	..	..	X	..
<i>Scaevola aemula</i> .. ..	..	X	..	..	..
Haloragaceae					
<i>Haloragis glauca</i> .. ..	..	..	..	X	..
<i>H. heterophylla</i> .. ..	..	..	..	X	..
Lamiaceae					
* <i>Marrubium vulgare</i>	X	..	..	..	..
<i>Teucrium racemosum</i>	X	..	..	X	X
Linaceae					
<i>Linum marginale</i>	X	..	..	..	..
Lobeliaceae					
<i>Pratia concolor</i> .. ..	..	..	X	..	..
Loranthaceae					
<i>Amyema quandang</i> .. ..	..	X	..	..	..
<i>Lysiana</i> sp. .. ..	..	..	..	X	..
<i>L. subfalcata</i> .. ..	..	X	..	..	..
Lythraceae					
<i>Lythrum hyssopifolia</i> .. ..	..	..	X	..	X
Malvaceae					
<i>Abutilon halophilum</i> .. ..	..	..	..	..	X
<i>A. otocarpum</i> .. ..	..	X	..	..	..
<i>Hibiscus brachysiphonius</i>	X	..	..	..	..
<i>Lavatera plebeia</i> .. ..	..	..	..	X	X
* <i>Malva parviflora</i> .. ..	..	..	X	..	X
<i>Malvastrum americanum</i> .. ..	..	..	..	X	X
<i>Sida corrugata</i>	X	..	..	X	..
<i>S. cunninghami</i>	X	X	..	..	..
<i>S. fibulifera</i> .. ..	..	X	..	..	X
<i>S. intricata</i> .. ..	..	..	..	X	..
<i>S. trichopoda</i>	X	..	..	..	X
Mimosaceae					
<i>Acacia aneura</i> .. ..	..	X	..	..	..
<i>A. burkittii</i> .. ..	..	X	..	..	..
<i>A. excelsa</i> .. ..	..	X	..	..	..
<i>A. loderi</i> .. ..	..	..	..	X	..
<i>A. oswaldii</i> .. ..	..	X	..	..	..
<i>A. stenophylla</i> .. ..	..	..	..	..	X
Myoporaceae					
<i>Eremophila bignoniiflora</i>	X	..	X	..	..
<i>E. longifolia</i> .. ..	..	X	..	X	X
<i>E. mitchellii</i>	X	X	..	..	..
<i>E. sturtii</i> .. ..	..	X	..	X	..
<i>Myoporum deserti</i> .. ..	..	X	..	..	..
<i>M. platycarpum</i> .. ..	..	..	..	X	..
Myrtaceae					
<i>Eucalyptus intertexta</i>	X
<i>E. largiflorens</i>	X
<i>E. populnea</i>	X	X
<i>E. socialis</i>	X
Oleaceae					
<i>Jasminum lineare</i>	X

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Oxalidaceae					
<i>Oxalis corniculata</i>	X	X	X	X	X
Papaveraceae					
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	..	X
Plantaginaceae					
<i>Plantago cunninghamii</i>	X	..	X	..	X
<i>P. drummondii</i> .. .. .	..	..	..	X	X
<i>P. turrifera</i>	X	X	..	X	..
Pittosporaceae					
<i>Pittosporum phillyreoides</i> .. .. .	..	X	..	..	..
Polygonaceae					
<i>Muehlenbeckia cunninghamii</i> .. .. .	..	..	..	..	X
<i>Rumex brownii</i>	X	X	..	..	..
<i>R. crystallinus</i> .. .. .	..	..	..	X	X
<i>R. tenax</i> .. .. .	..	..	X	..	..
Portulacaceae					
<i>Calandrinia balonensis</i> .. .. .	..	..	..	..	X
<i>C. eremaea</i>	X	..	X	X	..
<i>C. sp.</i> .. .. .	..	..	..	X	..
<i>Portulaca oleracea</i> .. .. .	..	X	X	..	X
Primulaceae					
* <i>Anagallis arvensis</i> .. .. .	..	X	..	..	..
Proteaceae					
<i>Hakea tephrosperma</i>	X	X	..	..	..
Ranunculaceae					
<i>Myosurus minimus</i> .. .. .	..	..	X	X	X
<i>Ranunculus pentandrus</i> var. <i>platycarpus</i>	X	..	..	X	..
Resedaceae					
* <i>Reseda luteola</i> .. .. .	..	X	..	..	..
Rubiaceae					
<i>Asperula cunninghamii</i>	X	X	..	..	..
<i>Canthium oleifolium</i> .. .. .	..	X	..	..	..
Rutaceae					
<i>Geijera parviflora</i>	X	X	..	..	..
Santalaceae					
<i>Exocarpos aphyllus</i> .. .. .	..	..	..	..	X
Sapindaceae					
<i>Dodonaea attenuata</i>	X	X	..	X	..
<i>D. bursariifolia</i>	X	..	..	..	..
<i>D. viscosa</i> var. <i>arborescens</i> .. .. .	..	X	..	..	..
<i>Heterodendrum oleifolium</i>	X	..	..	X	..
Scrophulariaceae					
<i>Morgania floribunda</i> .. .. .	..	..	..	X	..
* <i>Veronica arvensis</i> .. .. .	..	..	X	..	..
Solanaceae					
<i>Lycium australe</i> .. .. .	..	..	..	X	..
* <i>L. ferocissimum</i>	X	..	X	X	X
<i>Nicotiana goodspeedii</i>	X	..	..	..	..
<i>N. velutina</i>	X	..	..	..	..
* <i>Solanum elaeagnifolium</i> .. .. .	..	..	..	..	X
<i>S. esuriale</i> .. .. .	..	X	X	..	X
<i>S. ferocissimum</i> .. .. .	..	X	..	..	..
* <i>S. nigrum</i>	X	X	..	..	..
Thymelaeaceae					
<i>Pimelea microcephala</i> .. .. .	..	X	..	..	..
<i>P. trichostachya</i>	X	..	..	..	..
Urticaceae					
* <i>Urtica urens</i>	X	..	..	..	..
Verbenaceae					
* <i>Verbena bonariensis</i> .. .. .	..	..	..	X	..
* <i>V. officinalis</i> .. .. .	..	..	..	..	X

Botanical name	Booberoi	Cobar	Micabil	Sayers Lake	Trida
Zygophyllaceae					
<i>Nitraria billardieri</i> .. .. .	..	..	..	..	X
<i>Tribulus occidentalis</i> .. .. .	..	X	..	..	..
<i>Zygophyllum eremaeum</i> .. .. .	..	X	..	..	..
<i>Z. glaucum</i> .. .. .	..	..	..	..	X
<i>Z. iodocarpum</i> .. .. .	..	..	..	X	X
<i>Z. ovatum</i> .. .. .	..	..	..	X	..
MONOCOTYLEDONS					
Amaryllidaceae					
<i>Calostemma purpureum</i>	X	..	..	..	..
Cyperaceae					
<i>Carex inversa</i>	X	..	X	..	..
<i>Eleocharis acuta</i>	X	..	X	..	..
<i>E. obicis</i> .. .. .	..	..	X	..	..
<i>E. pallens</i>	X	..	..	..	X
<i>E. plana</i> .. .. .	..	..	..	X	..
<i>Fimbristylis dichotoma</i>	X	..	X	..	..
Juncaceae					
<i>Juncus aridicola</i> .. .. .	..	X	X	..	..
<i>J. bufonius</i> .. .. .	..	..	X	..	X
<i>J. radula</i>	X	..	..	..	..
Juncaginaceae					
<i>Triglochin calcitrapa</i> .. .. .	..	..	..	X	..
Liliaceae					
<i>Anguillaria dioica</i>	X	..	X	..	..
<i>Arthropodium minus</i>	X	..	..	..	..
<i>Bulbine alata</i>	X	..	..	..	X
<i>B. bulbosa</i>	X	..	..	..	X
<i>B. semibarbata</i> .. .. .	..	..	X	X	..
<i>Dianella laevis</i>	X	X	..	..	..
<i>Thysanotus baueri</i> .. .. .	..	X	X	X	X
<i>T. tuberosus</i> .. .. .	..	..	..	X	..
Poaceae					
<i>Agropyron scabrum</i>	X	X	X	X	X
<i>Agrostis avenacea</i>	X	..	X	X	X
* <i>Alopecurus geniculatus</i>	X	..	..	X	..
<i>Amphibromus neesii</i>	X	..	X	..	..
<i>Aristida behriana</i>	X	X	..	..	..
<i>A. calycina</i> .. .. .	..	X	..	..	..
<i>A. contorta</i> .. .. .	..	X	..	..	..
<i>A. echinata</i> .. .. .	..	X	..	..	..
<i>A. jerichoensis</i> var. <i>subspinulifera</i> .. .. .	..	X	..	..	..
<i>Astrebla pectinata</i>	X	..	..	..	X
* <i>Avena fatua</i>	X	..	..	..	..
<i>Bothriochloa biloba</i> .. .. .	..	X	..	..	..
<i>B. macra</i> .. .. .	..	X	..	..	..
<i>Brachiaria milliiiformis</i>	X	..	..	..	..
<i>Bromus arenarius</i> .. .. .	..	..	..	X	X
<i>Chloris acicularis</i>	X	X	X	..	..
<i>C. truncata</i>	X	X	X	X	X
<i>Cymbopogon oblectus</i> .. .. .	..	X	..	..	..
<i>Cynodon dactylon</i> .. .. .	..	X	..	..	..
<i>Danthonia caespitosa</i>	X	X	X	X	X
<i>Dichanthium sericeum</i> .. .. .	..	X	..	..	..
<i>Digitaria brownii</i> .. .. .	..	X	..	..	..
<i>D. coenicola</i>	X	X	..	..	..
<i>D. divaricatissima</i> .. .. .	..	..	X	..	..
<i>D. hystrichoides</i> .. .. .	..	X	..	..	..
<i>Diplachne fusca</i> .. .. .	..	..	X	..	X
<i>D. muelleri</i> .. .. .	..	..	..	..	X

Botanical name	Booberoi	Cobar	Micabil	Sayers Lake	Trida
<i>Enneapogon avenaceus</i>	..	X	..	X	X
<i>E. intermedius</i>	..	X	..	..	..
<i>E. nigricans</i>	X	..	..	..	..
<i>E. polyphyllus</i>	..	X	..	..	..
<i>Eragrostis australasica</i>	X	..	..	X	X
<i>E. brownii</i>	..	..	X	..	..
* <i>E. cilianensis</i>	..	X	..	..	..
<i>E. dielsii</i>	..	..	X	X	..
<i>E. eriopoda</i>	..	..	..	X	..
<i>E. parviflora</i>	..	..	X	..	X
<i>E. setifolia</i>	..	..	..	X	X
<i>Eriochloa australiensis</i>	..	..	..	..	X
<i>E. pseudoacrotricha</i>	X	..	X	X	X
* <i>Hordeum leporinum</i>	X	X	X	X	X
<i>Iseilema vaginiflorum</i>	..	..	..	..	X
* <i>Koeleria phleoides</i>	..	..	..	X	..
* <i>Lolium perenne</i>	..	..	X	..	..
* <i>L. rigidum</i>	X	..	..	..	..
<i>Lophochloa cristata</i>	..	..	..	X	..
<i>L. pumila</i>	..	..	..	X	..
<i>Monochather paradoxa</i>	..	X	..	..	..
<i>Neurachne munroi</i>	..	X	..	..	..
<i>Panicum decompositum</i>	..	X	..	X	..
<i>P. prolutum</i>	..	..	..	X	..
<i>P. queenslandicum</i> var. <i>queenslandicum</i>	X	..	..	..	X
<i>P. subxerophilum</i>	..	X	..	..	..
<i>P. whitei</i>	X	..	X	..	X
* <i>Parapholis incurva</i>	X	..	X	X	..
* <i>P. strigosa</i>	..	..	..	..	X
<i>Paspalidium constrictum</i>	..	X	..	..	..
<i>Perotis rara</i>	..	..	..	X	..
* <i>Phalaris aquatica</i>	..	..	X	..	..
* <i>P. paradoxa</i>	X	..	X	X	..
<i>Poa fordeana</i>	..	..	..	..	X
* <i>Schismus barbatus</i>	X	X	X	X	X
<i>Sporobolus actinocladus</i>	..	..	..	..	X
<i>S. caroli</i>	X	..	X	X	X
<i>Stipa bigeniculata</i>	..	..	X	..	..
<i>S. elegantissima</i>	X	..	..	..	..
<i>S. falcata</i>	..	..	..	X	..
<i>S. scabra</i>	..	X	X	..	..
<i>S. setacea</i>	..	X	..	..	..
<i>S. tuckeri</i>	..	X	..	..	..
<i>S. variabilis</i>	X	X	..	X	X
<i>Thyridolepis mitchelliana</i>	..	X	..	..	..
<i>Tragus australianus</i>	..	..	X	..	..
<i>Tripogon loliiformis</i>	..	..	X	..	..
<i>Triraphis mollis</i>	..	..	..	X	..
<i>Vulpia myuros</i>	X	..	X	..	X
Xanthorrhoeaceae					
<i>Lomandra effusa</i>	..	X	..	..	..

FLORISTICS OF THE SITES

Number of species recorded

Overall, the study indicated that no fewer than 401 species or varieties of plants from 61 families and 191 genera were recorded over the five sites. The area supporting the most species was Sayers Lake (156 species), followed by Cobar (152), Booberoi and Trida (142) and lastly Micabil (108). These figures should be regarded as an initial assessment of the species assemblage at each site. It should also be borne in mind that the communities at each site are dynamic, responding differently to

differing amounts or seasonal incidence of rainfall. Consequently, it is unlikely that all species will be found at a site at the one time.

Naturalized species

Of the 401 species recorded over the five sites, 55, or 13.75%, were exotic species which have become naturalized in the area. These species represent 17 families and 38 genera. The most prominent families were Poaceae (13 species), Asteraceae and Fabaceae (10 species each) and Brassicaceae (6 species). Two species from the family Verbenaceae were recorded, while the remaining twelve families contributed one species each.

The list of naturalized species contains one shrub, *Lycium ferocissimum*, and 54 grasses and forbs. Forty-one of these are annuals, 4 are annual to biennial, while the remaining 9 are perennials.

The proportion of naturalized species varies from 10% at Trida to 20% at Micabil. The overall figure of 13.75% compares very closely with the 13.05% of introduced species recorded by Turner (1903, 1904) for the area of New South Wales west of the 147° meridian of longitude. On the other hand, Leigh and Mulham (1977) found that 29% of the species on the Riverine Plain were naturalized. The network of rivers, creeks, swamps and irrigation channels across the Plain, together with more intense human settlement and land use, creates more favourable conditions for the spread and establishment of naturalized species.

From these species collections it appears that naturalized species are now a part of the vegetation and will persist in the regeneration areas for a very long time, even in the absence of grazing. As they are mainly annuals, it is probable that many of the naturalized species were abundant before exclosure but recent observations show that now they are often not abundant in the areas even after favourable climatic periods. On adjacent areas, which are still grazed by stock, naturalized species are often locally abundant, as is the case of Patersons Curse (*Echium plantagineum*) near Sayers Lake. This appears to be due to the fact that, in the absence of grazing, the total plant cover tends to be dominated by perennial forbs and grasses as was shown by Green, Walker & Cunningham (1976) at Cobar.

Uncommon native species

Several uncommon species have increased their numbers and maintained themselves in the regeneration areas. Such species include *Eleocharis obicis*, which was thought to be very rare or extinct but which is locally abundant at Micabil, and *Astrelba pectinata*, which grows at the Booberoi Regeneration Area over a considerable area (c. 0.5 ha). This species was first described from specimens collected in the locality by Mitchell in 1836, but is now not known to occur in the district other than in the regeneration area.

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