Environmental weeds of Western Australia

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See back page.

Summary

Four hundred and fifty eight species of naturalised plants have been recorded from conservation lands in Western Australia. Approximately 40 of these taxa pose serious conservation problems within these lands, and most require further study on their effects and control. New environmental weeds are most likely to originate from eastern Australia.

Introduction

Environmental weeds are plants which affect the conservation values of land which has as one of its primary purposes the conservation of flora and fauna. Within Western Australia most of these lands are under the control of the Department of Conservation and Land Management (CALM). This includes 4.8 million hectares of national parks; 10.4 million hectares of nature reserves; and 1.8 million hectares of State Forest—(approximately 7 per cent of the land area of Western Australia). However, other conservation lands are vested in other government departments: Fisheries, Planning and Urban Development, Water Authority and Lands and also local government, federal government and specific quangos such as the Kings Park Board and Rottnest Island Authority.

Western Australia is a continental sized state stretching from the tropics in the north to the cool temperate south, with conservation reserves ranging from remote, large, essentially pristine areas to small inner urban areas with a long history of disturbance. Hence it has a large and varied weed flora.

Until recently the study of environmental weeds has been a neglected field in Western Australia. Many published checklists for conservation reserves did not list naturalised species or only listed those that were so common that they could not be ignored. Similarly herbarium collections of naturalised species are too poor to enable an understanding of the range of almost any species.

There are several aims of this review. Firstly, to present a list of naturalised plants recorded from conservation lands. Secondly, an appendix presents an annotated list of weeds presenting major conservation problems, locally and widespread in scale. Finally, future problem species are discussed.

Naturalised taxa

After 165 years of European settlement, Western Australia has acquired 848 species of naturalised alien plants (Green, 1985). Of these, 458 taxa (54 per cent of the total) have been recorded from conservation lands (table 1). The major families comprising this weed flora are the Poaceae (80 species), Iridaceae (32 species), Fabaceae (34 species) and the Asteraceae (32 species). Like the banksia woodlands weed flora (Keighery, 1989) the majority of species are herbaceous and few are woody shrubs (unlike eastern Australia).

The records listed in table 1 only denote an occurrence within the boundaries of a conservation reserve and not the significance of such an occurrence. Documentation of where the weeds occur (for example, what vegetation types) and under what disturbance regimes such weeds threaten the conservation values of the reserves is a current research thrust.

Such surveys are being undertaken in specific vegetation types, for example, banksia woodlands (Keighery, 1989) or tuart woodland (Piggott, unpublished report; Keighery, unpublished data) or specific reserves. The reserve surveys include both CALM and non-CALM estate, including local government reserves such as Bold Park (Keighery *et al.* 1991).

Many of these weeds will not be recorded in intact or little disturbed natural vegetation and will be encountered only in highly disturbed regions of conservation lands (edges of roads, tracks, firebreaks and picnic areas). However, this is the basic list of the environmental weeds of Western Australia. The author is not aware if such a listing has been attempted elsewhere in Australia.

Significant environmental weeds

Because the composition of the environmental weed flora of Western Australia differs in composition and life form (as does the native flora) from much of eastern Australia, those species which have a major impact on conservation values are often different. This can be illustrated by noting that Boneseed (*Chrysanthemoides monilifera* ssp. *monilifera*), while present in Western Australia, has never become a

major weed as in South Australia and Victoria.

In appendix I approximately 40 species of significant environmental weeds are briefly annotated. In many cases the exact ecological effects of these species and documentation of control measures is poorly known. It is hoped that this list may help stimulate further studies on these species.

Potential weeds

Currently there are few woody weeds that pose a major conservation problem in Western Australia. However the potential for such a lifeform remains, especially species introduced from eastern Australia. For example seven species of eastern acacia have become established in southern Western Australia, especially in state forest. Several of these (*Acacia dealbata, A. decurrens, A. longifolia* and *A. melanoxylon*) have demonstrated the ability to become invasive. Given the number of species of this vast genus which are increasingly grown in Western Australia some will escape into bushland.

Similarly the planting of large numbers of trees and shrubs throughout Western Australia under federal and state tree planting programs has the potential to add other woody weeds to our flora. For example plantings of *Eucalyptus maculata* and *Brachychiton populeneum* along roadsides in Kings Park are converting a banksia low woodland into a eucalypt woodland (Keighery, 1988).

Thus it would appear that the greatest potential for new environmental weeds are Australian natives from eastern Australia, probably followed by local species being planted outside their known ranges.

References

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Table 1. Naturalised taxa recorded from conservation lands in Western Australia

Summary	species
Ferns	2
Gymnosperms	2
Monocotyledons	154
Dicotyledons	300

Key to postscript

1 National park
2 Nature reserve
3 State forest
4 Local government reserve
5 Other conservation reserves

Data from published lists, CALM file records, consultant reports, herbarium records, unpublished survey reports by G.J. Keighery, J. Alford and E.M. Goble-Garrett.

Ferns	
Hypolepis rugosa	3
Cyathea cooperi	3, 5
Gymnosperms	
Pinus pinaster	3, 4,
P. radiata	3
Monocotyledons	
TYPHACEAE	
Typha orientalis	1, 2, 3, 4, 5
HYDROCHARITACEAE	
Egeria densa	5
POACEAE	
Aira caryophyllea	1, 2, 3, 4
A. cupaniana	1, 3, 4
Alopecuros geniculatus	3, 5
Ammophila arenaria	1, 3
Anthoxanthum odoratum	1, 3
Arundo donax	1, 2
Avellinia michellii	2, 3
Avena barbata	1, 2, 3, 4, 5
A. fatua	1, 2, 3, 4, 5
Brachiaria mutica	1
Briza maxima	1, 2, 3, 4, 5
B. minor	1, 2, 3, 4, 5
Bromus catharticus	1, 3, 5
B. diandrus	1, 2, 3, 4, 5
B. madritensis	2, 3, 4
B. hordeaceus	2, 3
B. rubens	2
Catapodium rigidum	1, 2
Cenchrus biflorus	1

C. ciliaris	1, 2,
C. setigerus	1
C. echinatus	1
Chloris inflata	1
Cortaderia selloana	2, 3, 4
Cynodon dactylon	1, 2, 3, 4
Digitaria ciliaris	1, 2, 3, 5
D. sanguianalis	1, 2, 3, 4, 5
Echinochloa colona	1, 2
E. telmatophila	2
Ehrharta breviflora	1, 2, 3
C. calycina	1, 2, 3, 5
E. longiflora	1, 2, 3, 5
E. villosa	1, 2
Eragrostis curvula	1, 5
E. ?cilianensis	2, 5
Hainardia cylindrica	1
Holcus lanatus	1, 4, 5
Hordeum glaucum	1, 2
H. leporinum	1, 2
Hyparrhenia hirta	4, 5
Lagurus ovatus	1, 2, 3, 5
Lamarckia aurea	1
Lolium multiflorum	1, 2, 5
L. perenne	1, 2, 3
L. rigidum	1, 2, 4, 5
Lophochloa pumila	1
Mibora minima	1, 3
Panicum ?maximum	1
P. ?milliaceum	1
Parapholis incurva	1, 2, 4
Paspalum conjugatum	2
P. dilatatum	2, 5
P. distichum	2
P. urvillei	2, 5
Pennisetum clandestinum	1, 2, 3, 4
P. purpureum	4, 5
P. villosum	1, 5
Pentaschistis airoides	1, 2, 3, 4, 5
P. thunbergii	1, 2, 5
Periballia minuta	3
Phalaris aquatica	2
P. canariensis	1, 3
P. minor	1, 3
Phleum pratensis	1, 2, 4
Phragmites australis	4
Piptatherum miliaceum	5
Plagiochloa uniolae	1, 3
Poa annua	1, 2, 3, 4, 5
Polypogon monspeliensis	1, 4
Rhynchelytrum repens	3, 4, 5
Schismus barbatus	1
Setaria gracilis	1
Sorghum bicolor	1
S. helepense	1
Sporobolus indicus	1, 5
Stenotaphrum secundatum	1, 2, 4, 5
Trisetaria cristata	4
Urochloa sp	4
Vulpia bromoides	1, 2, 3
V. myuros	1, 2, 3
CYPERACEAE	
Carex divisa	1, 5
Cyperus compressus	1
C. congestus	1, 2
C. eragrostis	2
C. hamulosus	2
C. tenellus	1, 2, 3
C. tenuiflorus	2
Isolepis prolifer	1, 2, 3
AREACACEAE	
Phoenix dactylifera	1
ARACEAE	
Arum italicum	3
Zantedeschia aethiopica	1, 3, 4, 5
PONTERIDACEAE	
Eichhornia crassipes	4, 5
JUNCACEAE	
Juncus acutus	5
J. bufonius	1, 2, 4
J. articulatus	1
J. capitatus	1, 2, 3, 4
J. microcephalus	3
J. oxycarpus	1
ASPARAGACEAE	
Myrsiphyllum asparagoides	1, 2, 4, 5
M. crispus	4, 5
Asparagus officinalis	4
ASPHODELACEAE	
Asphodelus fistulosus	2, 5
Trachyandra divaricata	1, 2, 5
HYACEINTHACEAE	
Albuca canadensis	3
Lachenalia aloides	1, 5
L. orchidioides	5
L. reflexa	2, 4
Ornithogalium arabicum	5
ALLIACEAE	
Allium orientale	4, 5
A. triquetrum	3, 5
Nothoscordum gracile	5
COLCHICACEAE	
Baeometra uniflora	3, 5
TECOPHILAEACEAE	
Cyanella capensis	4
AMARYLLICACEAE	
Amaryllis belladonna	3, 5
Narcissus tazetta	3, 4, 5

AGAVACEAE	
Agave americana	1, 2, 5
A. sisalana	5
Fucarena foetida	5
IRIDACEAE	
Babiana stricta	4, 5
Chasmanthe floribunda	1, 3, 5
Crocosmia crocosmiiflora	1
Ferraria crispa	1, 4, 5
Freesia leichtlinii	1, 3, 4, 5
Gadiolus angustus	1, 2, 5
G. cardinalis	1
G. caryophyllaceus	1, 2, 4
G. tristis	2
G. undulatus	2, 4
Gynandriris setifolia	1, 2
Hesperantha falcata	1, 2, 4, 5
Hexaglottis lewisiae	2
Homeria flaccida	1, 2, 3, 4, 5
H. miniata	3, 5
Homoglossum watsonium	4
Iris germanica	2, 3
Ixia maculata	3, 4
I. polystachya	3
Lapeirousia sp	5
Moraea fugax	2
Romulea flava	4, 5
R. rosea	1, 2, 3, 4, 5
Sparaxis bulbilfera	2, 4
S. pillansii	5
Tritonia lineata	3
Watsonia aletroides	5
W. bulbillifera	1, 2, 3, 4, 5
W. leipoldtii	3, 4
Watsonia marginata	1, 3
W. meriana	1, 3
W. pyramidata	1, 3
W. verfsfeldii	1, 3
ORCHIDACEAE	
Monadenia bracteata	1, 2, 3, 5

Dicotyledons

MORACEAE	
Ficus carica	1, 4, 5
SALICACEAE	
Populus nigra cv Italica	2
CASUARINACEAE	
Casuarina glauca	2
URTICACEAE	
Urtica urens	2, 4, 5
Soleirolia soleirolii	1
POLYGONACEAE	
Emex australis	1
Polygonum arenastrum	1
Rumex acetosella	1, 4
R. conglomeratus	1, 2, 4
R. crispus	1, 2, 3, 4, 5
R. vesicarius	1, 5
CHENOPODIACEAE	
Atriplex prostrata	1, 4
Chenopodium album	2
C. murale	1, 2, 4
AMARANTHACEAE	
Aerva javanica	1, 2
Alternanthera pungens	2
Amaranthus albus	1
Pupalia lappacea	2
PHYTOLACCACEAE	
Phytolacca americana	1, 2
AIZOACEAE	
Aptenia cordifolia	1
Carpobrotus aequilaterus	1
C. edulis	1, 2, 5
Galenia pubescens	4, 5
Lampranthus glaucus	1
Mesembryanthemum aitonis	2
M. crystallinum	1, 2, 5
M. nodiflorum	1
Micropterum papillosum	1
Tetragonia decumbens	1, 2, 5
Trianthema portulacastrum	1
PORTULACACEAE	
Portulaca oleracea	2
CARYOPHYLLACEAE	
Arenaria serpyllifolia	1, 4
Cerastium glomeratum	1, 3, 5
C. semidecandrum	1
Corrigiola litoralis	1
Gypsophila tubulosa	2
Moenchia erecta	1, 4
Minuartia hybrida	4, 5
Petrorhagia velutina	1, 5
Polycarpon tetraphyllum	5
Saginia apetala	1, 2, 5
S. maritima	1
Silene gallica	1, 2, 5
S. nocturna	1, 2
Spergula arvensis	1, 2, 4, 5
Spergularia diandra	1, 2, 4, 5
S. rubra	2
Stellaria media	2, 4, 5
RANNUNCULACEAE	
Ranunculus muricatus	1
PAPAVERACEAE	
Argemone ochroleuca	1

Romneya coulteri	5
FUMARIACEAE	
Fumaria capreolata	1, 3, 4, 5
F. muralis	1, 3
BRASSICACEAE	
Brassica napus	2
B. rapa	2, 3
B. tournefortii	1, 2, 4, 5
Cakile edentula	1
C. maritima	1, 2
Cardamine hirsuta	3, 5
Carrichtera annua	1, 2
Coronopus didymus	2, 5
Diplotaxis muralis	1
Heliophila pusilla	1, 2, 3, 5
Hymenolobus procumbens	2, 5
Lepidium bonariense	1
Raphanus raphanistrum	1, 2, 5
Nasturtium officinale	1
Sisymbrium erysimoides	1, 2
S. irio	2, 4, 5
S. orientale	2, 4, 5
RESEDACEAE	
Reseda lutea	4, 5
R. luteola	3
CRASSULACEAE	
Aeonium castello-paveoniae	1
Cotyledon orbiculare	2
Crassula alata	4, 5
C. decumbens	1, 4
C. glomerata	1, 5
C. natans	1, 2, 3, 4, 5
C. tetragona	1
C. thunbergiana	1, 2, 5
ROSACEAE	
Acaena agnipila	3
A. echinata	1, 3
A. novae-zelandiae	3
Rubus discolor	1, 3
R. selmeri	1, 2, 3
R. ulmifolius	1, 2, 3, 4
MIMOSACEAE	
Acacia karroo	1
A. bailyeana	1, 3
A. dealbata	1, 3
A. decurrens	1, 3
A. longifolia	5
A. melanoxylon	3, 4
A. podaryliifolia	1, 3
A. pycnantha	1, 3
Leucaena leucocephala	2, 3
CAESALPINIACEAE	
Cassia occidentalis	2
Parkinsonia aculeata	1, 2
FABACEAE	
Cytisus proliferus	3
Dipogon lignosus	3, 5
Genista canariensis	3
Lathyrus tingitanus	3
Lotus angustissimus	2, 3
L. uliginosus	1, 2, 3
Lupinus albus	3
L. angustifolius	1, 2, 3
L. cosentinii	1, 2, 4
L. luteus	3
L. mutabilis	5
Macroptilium atropurpureum	2
Medicago polymorpha	1, 2, 3, 5
M. truncatula	1, 3
Melilotus indica	2, 4, 5
Ornithopus compressa	4, 5
O. pinnata	4, 5
Podalyria sericea	1, 3
Psoralea pinnata	1, 4
Stylosanthes guineensis	2
Trifolium angustifolium	1, 2, 4
T. arvense	1, 2, 3, 5
T. campestre	1, 2, 3, 5
T. cernuum	1, 2, 3
T. dubium	1, 2, 3, 4, 5
T. fragiferum	3
T. glomeratum	1, 2, 3, 4, 5
T. hirtum	3
T. pratense	1, 3
T. stellatum	1, 2, 3
T. subterraneum	1, 2, 3, 4, 5
T. tomentosum	3, 5
Ulex europaeus	1, 2
Vicia hirsuta	1, 2, 4
V. sativa	1, 2, 4
GERANIACEAE	
Erodium aureum	2
E. botrys	1, 2, 4, 5
E. cicutarium	1, 2, 3, 4, 5
E. moschatum	2, 3, 5
Geranium dissectum	1, 2, 3
G. molle	1, 2, 3, 5
Pelargonium alchellimoides	1
P. capitatum	1, 2, 4, 5
OXALIDACEAE	
Oxalis pes-caprae	1, 2, 4, 5
O. polyphylla	2, 4, 5
O. purpurea	3, 4, 5
TROPAEOLACEAE	
Tropaeolum majus	2, 5
LINACEAE	
Linum trigynum	1, 3

POLYGALACEAE	
Polygala myrtifolia	2, 4, 5
EUPHORBIACEAE	
Euphorbia australis	5
E. helioscopia	1
E. hirta	1, 2
E. paralias	1, 2, 4
E. peplus	1, 2, 4, 5
E. terracina	1, 2, 4
Mercurialis annua	1
Ricinus communis	1, 5
CALLITRICHACEAE	
Callitriche stagnalis	2, 3
ANACARDIACEAE	
Magnifera indica	5
Schinus molle	3
RHAMNACEAE	
Rhamnus alaternus	4, 5
VITACEAE	
Vitis vinifera	1, 2
TILIACEAE	
Corchorus olitorius	2
MALVACEAE	
Lavatera arborea	2, 5
L. cretica	1, 2
Malva parviflora	1, 2, 3, 5
Malvastrum americanum	1, 2
Sida acuta	1, 2
STERCULIACEAE	
Brachychiton populeneum	5
CLUSIACEAE	
Hypericum perforatum	1
VIOLACEAE	
Viola odoratum	3
PASSIFLORACEAE	
Passiflora foetida	1, 2
CACTACEAE	
Opuntia stricta	2, 3
LYTHRACEAE	
Lythrum hyssopifolia	1
MYRTACEAE	
Agonis flexuosa	1, 5
Chamelaucium unicinatum	2, 5
Eucalyptus x maculata	5
Leptospermum laevigatum	1, 2, 3

ONAGRACEAE	
Epilobium ciliatum	1
E. tetragonum	1
Oenothera drummondii	1, 4, 5
O. glazioviana	1
APRACEAE	
Bupleurum semicompositum	1, 2
Conium maculatum	1
Daucus carrota	1
Foeniculum vulgare	1, 2
PRIMULACEAE	
Anagallis arvenis var. arvensis	1, 2, 3
A. arvenis var. foemina	1, 2, 3, 4
Samolus valerandi	1
PLUMBAGINACEAE	
Limonium sinuatum	1
OLEACEAE	
Olea europaea	3
BUDDLEJACEAE	
Buddleja madagascariensis	5
GENTIANACEAE	
Centaurium erythraea	1, 2, 3, 4
C. spicatum	1, 2, 4
Cicendia filiformis	2
APOCYNACEAE	
Catharanthus roseus	1
Vinca major	3, 5,
ASCELPIDACEAE	
Calotropis procera	1, 5
Gomphocarpus fruticosus	1, 2, 3
CONVOLVULACEAE	
Ipomoea carica	2, 4
I. indica	2, 3, 4, 5
Merremia dissecta	1, 2
Cuscuta epithymum	2
BORAGINACEAE	
Echium plantagineum	1, 2, 3
VERBENACEAE	
Lantana camara	4
Phyla nodiflora	4
LAMIACEAE	
Hyptis suaveolens	1, 2
Lavandula stoechas	3
Leonotis leonurus	4
L. nepetaeifolia	5
Mentha pulegium	1
M. spicata	1
M. suaveolens	1, 4

M. x piperita	1, 4
Prunella vulgaris	1
Salvia verbenaca	4
Stachys arvensis	1, 2, 3, 4, 5
SOLANACEAE	
Datura innoxia	1, 3
Lycium ferocissimum	2, 4, 5
Nictoiana glauca	2, 5
Physalis minima	1
P. peruviana	1, 5
Solanum hystrix	1
S. laciniatum	1
S. nigrum	1, 2, 3, 4, 5
S. sodomaeum	1, 2
SCROPHULARIACEAE	
Bellarida trixago	1, 2, 3, 4
Cymbalaria muralis	2
Dischisma arenarium	1, 2, 4
D. capitatum	2, 5
Kickxia elatine	1
Misopates orontium	1
Parentucellia latifolia	1, 2, 3, 5
P. viscosa	1, 2, 3, 5
Polycarena heterophylla	2
Verbascum creticum	1, 3
Veronica arvensis	1, 3
OROBANCHACEAE	
Orobanche minor	1, 2, 3, 4, 5
PLANTAGINACEAE	
Plantago coronopus	2, 3
P. lanceolata	1, 3
P. major	1, 2, 3, 4
RUBIACEAE	
Galium divaricatum	1, 2
G. murale	1, 2
Sherardia arvensis	1, 3
DIPSACEAE	
Scabiosa atropurpurea	1, 4
CUCURBITACEAE	
Citrullus colocynthis	1, 2
C. lanatus	1, 2
Cucumis melo ssp. agrestis	2
C. myriocarpus	1, 3
CAMPANULACEAE	
Wahlenbergia capensis	1, 2, 3, 4, 5
LOBELIACEAE	
Monopsis debilis	1, 2, 3

ASTERACEAE	
Acanthospermum hispidum	1
Achillea millefolium	3
Ambrosia artemsisiifolia	4, 5
Anthemis cotula	3
Arctotheca calendula	1, 2, 3, 4, 5
A. populifolia	1, 2
Argyranthemum frutescens	4
Artemisia absinthium	2
Aster subulatus	1, 2, 3
Berkheya rigida	1
Bidens bipinnata	1, 2, 4
B. pilosa	1
Carduus pycnocephalus	1, 2, 3
Carthamus lanatus	1
Centaurea melitensis	1, 2, 5
Chrysanthemoides monilifera	2, 3
Cirsium arvense	1
C. vulgare	1, 2, 3
Conyza albida	1, 2, 3, 5
C. bonariensis	1, 2, 3, 5
C. canadensis	1, 2, 3
C. parva	1, 2, 3
Cotula bipinnata	1
C. turbinata	1, 3, 5
Crepis foetida	3
Dittrichia graveolens	1, 2, 3, 5
D. viscosa	2, 3
Filago gallica	3
Gnaphalium calviceps	1, 2
G. coarctatum	1, 2
Hedypnois rhagadioloides	1
Helipterum roseum	5
Hypochaeris glabra	1, 2, 3, 4, 5
Lactuca saligna	2
L. serriola	2, 5
Osteospermum calendulaceum	2
O. clandestinum	1, 2, 5
Pseudognaphalium luteo-album	1, 2, 3, 5
Senecio elegans	1, 2
S. didiscoides	3
S. glastifolius	4
S. vulgaris	1, 3, 4
Sigesbeckia orientalis	1, 3
Soliva pterosperma	1
Sonchus asper	1, 2, 3
S. oleraceus	1, 2, 3, 4, 5
S. tenerrimus	1, 2
Tolpis barata	1, 2
Urospermum picroides	1, 2, 4
Ursinia anthemoides	1, 2, 3, 4, 5
U. speciosa	1
Vellereophyton dealbatum	1, 2, 3, 4

Appendix I

An annotated list of significant environmental weeds of Western Australia

ARACEAE

Zantedeschia aethiopica (Arum Lily)
A weed of coastal southern Western Australia. Invades streamside and swamp vegetation and has lately become a major understorey weed of mature *Acacia rostellifera* shrubland on Garden Island (a federal reserve near Perth).
Replaces native understorey.

AREACEAE

Phoenix dactylifera (Date Palm)
Local weed along Fortescue River in Millstream National Park, Pilbara. Competes with and replaces local endemic palm *Livistonia alfredii*.

ASPARAGACEAE

Myrsiphyllum asparagoides (Bridal Creeper)
Widespread in southern Western Australia largely on calcareous soils. Severe infestations in Tuart (*Eucalyptus gomphocephala*) woodland in Yanchep National Park, limestone heath in Kings Park and near Hopetoun. Becoming widespread in linear reserves.
Documentation of effects still inadequate.

IRIDACEAE

Sparaxis bulbifera, Hesperantha falcata (also *Babiana stricta*)
Weeds of ephemeral wetlands of southern Western Australia. These cormous species compete directly with the rich native geophytic and annual flora of such areas.
Studies on the biology and control of these species urgently needed.

Freesia x *leichtlinii* (Freesia)
Widespread in higher rainfall areas of southern Western Australia. Severe infestations in banksia and tuart woodlands in Kings Park and on granite rocks in Cape Le Grande National Park. Potentially serious infestations have been controlled in Marri (*Eucalyptus calophylla*) woodland and Wandoo (*E. wandoo*) woodland in Dryandra State Forest.
Competes with and replaces native herbaceous species.

Gladiolus caryophyllaceus (Pink Gladiolus)
Sandy soils of the Swan coastal plain. Abundant in banksia woodland in this area and still spreading.
Documentation of effects and control inadequate.

Homeria flaccida (One-leafed Cape Tulip)
Widespread in southern Western Australia. Primarily a weed of calcareous sandy soil woodlands (tuart and banksia), especially those which have been grazed.
Control measures being studies at Woodvale Nature Reserve.

Romulea rosea (Guilford Grass)
Widespread in southern Western Australia. Primarily a weed of granite outcrops and heavy soil woodlands, especially York Gum (*Eucalyptus loxophleba*).
Replaces native geophytes.

Watsonia species (Watsonias)
A complex of four or five species, the major weed being *W. bulbillifera*. Occurs in wetter parts of southern Western Australia. A weed of streamsides, granitic rocks and winter wet loams.
Replaces understorey species. Management plans being prepared for this species (in John Forrest and Serpentine National Parks).

POACEAE

Cenchrus ciliaris (Buffel Grass)
Widespread in the Pilbara and adjacent arid and semi-arid regions. A weed of creeklines, alluvial flats and *Triodia* grasslands. Replacing *Triodia* on North West Cape. Regarded by traditional Aborigines in Rudall River area as a major threat to their food plants.
Still actively spreading.

Cortaderia selloana (Pampas Grass)
Wetter areas of southern Western Australia. A weed of wetlands and creeks in the northern areas of the Swan coastal plain, occurs in coastal heath near Albany. Smothers shrubs and sedges and increases fire frequency.
A major control program is being undertaken in Thompson Lake Nature Reserve.

Ehrharta calycina (Perennial Veldt Grass)
Widespread throughout southern Western Australia. Primarily a weed of sandy soil woodlands (banksia, tuart and jarrah–marri) of the Swan coastal plain. Competes directly with native herbaceous species and increases fuel loads, hence fire frequencies.
Being controlled using fusilade in Kings Park.

Eragrostis curvula (Love Grass), *Hyparrhena hirta* (Tambookie grass), *Avena* spp. (Wild Oats)
Widespread in southern Western Australia. Weeds of linear (road and rail) reserves. Compete directly with native herbaceous species, inhibit regeneration and increase fuel loads.

Pennisetum clandestinum (Kikuyu) and *Stenotraphum secundatum* (Buffalo Grass)
Wetter areas of southern Western Australia. Weeds of ephemeral wetlands and streamsides.
Smother smaller native species. Have been frequently introduced into natural areas as a lawn.

TYPHACEAE

Typha orientalis (Bullrush)
Widespread in southern Western Australia. A weed of ephemeral and permanent wetlands. Replaces native sedgelands, increases fire risk and closes water areas for wildlife.
Control programs being undertaken on several reserves in the metropolitan region.

ASTERACEAE

Cardus pycnocephalus, Cirsium vulgare (Thistles)
Widespread in southern Western Australia. Primarily weeds of granitic rocks and open woodlands. Becoming more common, as reserves isolated by clearing especially along southern coastal areas.
Probably replaces native annuals in such areas.

BRASSICACEAE

Brassica tournefortii (Long-fruited Wild Turnip)
Scattered to widespread in southern temperate and arid Western Australia. Abundant in Eucla National Park in heath, and at Shark Bay under acacia.
Effects unknown. Monitoring sites established.

Carrichterra annua (Wards Weed)
This highly unpalatable annual is now widespread throughout the Nullarbor and adjacent goldfields region. Apparently replaces native shrubland over-grazed by rabbits or sheep.
Effects still poorly known. Monitoring sites established.

CACTACEAE

Opuntia stricta (Common Prickly Pear)
Locally abundant on offshore islands of the Pilbara coast. Replaces native grassland and acacia shrublands.
Being controlled by *Cactoblastis* moths.

FABACEAE

Lupinus angustifolius (Narrow-leafed Lupin), *Lupinus cosentinii* (Blue Lupin)
Major weed species of Swan coastal plain. Able to invade coastal heathland. Changes soil characteristics, replaces native shrubs.
Being removed by local weeding groups from urban reserves.

Trifolium spp. (Clovers)
Widespread in southern Western Australia. Weeds of granitic slopes. Effects poorly known.
Requires further study.

MALVACEAE

Lavatera arborea (Tree Mallow)
Common on offshore islands off Perth. Replacing native *Lavatera pleibeia* var. *tomentosa* shrubland (an island endemic).
A management plan to remove this species has been prepared.

MYRTACEAE

Leptospermum laevigatum (Victorian Coastal Tea Tree)
Widespread and expanding in southern coastal Western Australia. Abundant locally in Leeuwin–Naturaliste National Park. Replaces native heathland.
Requires management action.

SOLANACEAE

Lycium ferocissimum (African Boxthorn)
Widespread on offshore islands, from Abrolhos Islands to the Recherche, in southern Western Australia. Replaces native *Nitraria billardieri* shrubland. This deciduous shrub replaces an evergreen species which provides nursery habitat for seals. Has been removed from the Abrolhos and the Lancelin–Dongara islands.

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PLANT INVASIONS

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