

## WEEDS OF WESTERN AUSTRALIA'S WEST COAST OFFSHORE ISLANDS

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*Summary.* The West Coast region of Western Australia, stretching from Perth to Shark Bay contains some 200 offshore limestone islands. These islands have relatively simple ecosystems with high levels of natural and human disturbance. Surveys have identified 101 species of naturalised plants on these islands. Of these 9 are of very minor importance, another 62 of minor importance but needing monitoring, and 30 of major significance. The minor weeds are listed, and the major weeds are briefly discussed in an annotated list. The most serious weeds are *Lavatera arborea*, *Lycium ferrocissimum* and *Zantdeschia aethiopica* which alter plant communities. The annual grasses (*Avena*, *Bromus* and *Ehrharta* species) are currently implicated in the decline of the Lancelin Island Skink.

### INTRODUCTION

Over 2,000 islands are spread unevenly along Western Australia's long coastline, over three major biogeographic regions (Tropical Coast, West Coast and Southern Coast). Many of these islands are of crucial importance to the conservation of endangered mammals, which are now extinct on the mainland. They are also important breeding sites for birds and seals (2). These islands have relatively simple ecosystems with high levels of natural disturbance, often with superimposed human disturbance. Approximately 224 species of naturalised plants have been recorded from these islands.

Within the study area, the West Coast region stretching from Perth to Shark Bay, are approximately 200 vegetated islands. These islands are all composed of limestone or sand over limestone and are generally close to the coast. The most distant being the Abrolhos Group, some 40 km offshore.

There is a considerable body of published information (1), plant collections and unpublished observations on the flora of these islands, especially those close to Perth. (These references are contained in a bibliography prepared by N. Gibson and M. Lyons to be published by Department of Conservation and Land Management (CALM) later this year.) However, these studies are of limited value in determining management for nature conservation as they are concentrated on the few accessible islands, the naturalised flora was poorly documented (for example, there were no records of Boxthorn on any of the Lancelin-Dongara islands), and there are considerable gaps in the documentation of the native flora of the islands, particularly in relation to the annual flora.

Recent floristic surveys of many of these islands have been made by the author and other CALM staff to collect specific records of weeds and vegetation changes to assist in the preparation of management plans (3,4).

### METHODS

The island surveys were by extensive foot traverse in Autumn and Spring to ensure collection of herbaceous weeds. Some control measures were undertaken using advice on appropriate herbicides from the Agricultural Protection Board. Monitoring is currently in progress.

## RESULTS AND DISCUSSION

The weeds recorded in the survey are grouped according to management priorities which relate to their impact on nature conservation values. Three groups are distinguished. Group 1 is very minor weeds with no obvious impact therefore of low management priority, i.e. no management or monitoring. Group 2 is minor weeds defined by no obvious impact but potential impact possible therefore of low management priority, i.e. no management but monitoring is required. Group 3 is the major weeds that require management as indicated below and associated monitoring.

Very minor weeds. These weeds have only been recorded on islands with permanent settlements, Rottneest and Garden Islands. They are *Allium ampeloprasum*, *Allium sativum*, *Narcissus tazetta*, *Ornithogalum umbellatum*, *Arundo donax*, *Typha orientalis*, *Cotula bipinnata*, *Ricinus communis* and *Ficus carica*. With the exception of *Cotula bipinnata*, a kerbside weed on Rottneest Island, they are all garden escapes. Recent surveys (1992) have shown that previously recorded minor garden escapes have died out (3,5). The 9 listed species are those still persisting in 1992. It is considered unlikely that any will become even minor weeds.

Minor weeds. The following 62 species are minor weeds, either confined to very disturbed areas, or having no apparent deleterious effect on the nature conservation values of the islands on which they occur. They are listed alphabetically under families, then genera

### Monocotyledons

Poaceae: *Aira caryophyllea*, *Aira cupiana*, *Briza maxima*, *Catapodium rigidum*, *Ehrharta villosa*, *Lagurus ovatus*, *Lolium multiflorum*, *Lolium rigidum*, *Paralophis incurva*, *Phalaris minor*, *Poa annua*, *Trisetaria cristata* and *Vulpia myorus*.

### Dicotyledons

Aizoaceae: *Tetragonia decumbens*.

Asteraceae: *Arctotheca calendula*, *Arctotheca populiifolia*, *Conyza albida*, *Conyza bonariensis*, *Conyza parva*, *Dittrichia graveolens*, *Hedynois rhagadioloides*, *Hypochaeris glabra*, *Lactuca serriola*, *Pseudognaphalium luteo-album*, *Vellereophyton dealbatum*.

Brassicaceae: *Brassica tournefortii*, *Cakile maritima*, *Hymenobolus procumbens*, *Sisymbrium erysimoides*, *Sisymbrium trio*.

Caryophyllaceae: *Cerastium glomeratum*, *Corrigiola littoralis*, *Polycarpon tetraphyllum*, *Sagina maritima*, *Spergularia diandra*, *Spergularia rubra*,

Crassulaceae: *Crassula glomerata*.

Euphorbiaceae: *Euphorbia paralias*, *Euphorbia peplus*, *Ricinus communis*

Fabaceae: *Lotus angustissimus*, *Medicago polymorpha*, *Melilotus indica*, *Trifolium campestre*, *Trifolium dubium*, *Trifolium glomeratum*.

Geraniaceae: *Erodium cicutarium*, *Pelargonium capitatum* .

Gentianaceae: *Centarium erythraea*, *Centaurium spicatum* .

Malvaceae: *Lavatera cretica*, *Malva parviflora* .

Orobanchaceae: *Orobanche minor*.

Oxalidaceae: *Oxalis pes-caprae*.

Phytolaccaceae: *Phytolacca octandra*.

Polygonaceae: *Emex australis*.

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Portulacaceae: *Portulaca oleracea*.

Primulaceae: *Anagallis arvensis*.

Rubiaceae: *Galium murale*, *Sherardia arvensis*.

Scrophulariaceae: *Dischisma arenaria* and

Solanaceae: *Solanum nigrum*.

## Major weeds

### Monocotyledons

Agavaceae: *Agave americana*/*Agave sisalana*. Recorded only as a garden escapes on Rottneest Island. Removed physically in 1990 because of tourist injury fears

Anthericaceae: *Trachyandra divaricata*. Common on beaches on many islands. Considered a serious weed of mainland coastal dunes (6). Monitored but control measures would be extremely difficult. On Garden Island widespread but in low density, apparently controlled by tamar grazing.

Araceae: *Zantedeschia aethiopica*. Serious invasive weed of *Acacia* shrublands on Garden Island where it was replacing the native understory. Being eradicated over a five year program of grided herbicide spraying funded by the Navy. Monitoring and spot spraying to continue after the major program ends. A management program to rehabilitate seriously affected areas is being prepared. Scattered clumps are known from Rottneest Island, and are being eliminated.

Asphodelaceae: *Asphodelus fistulosus*. Recorded from 16 islands. Potentially serious on Rottneest, where it has replaced heath after severe disturbance. Cessation of disturbance, animal enclosures and replanting is needed in these areas. Apparently not grazed by quokkas.

Asparagaceae: *Myrsiphyllum asparagoides*. Garden escape on Garden Island, and apparently controlled by grazing tamaras. Being closely monitored. On adjacent mainland is a very serious weed of the same vegetation associations.

Iridaceae: *Ferraria crispa*/*Homeria flaccida*. Garden escape on Rottneest Island and invading heathland. Potentially very serious weeds, as both are highly unpalatable to quokkas and hence are at an advantage compared to many palatable native seedlings after fire or other disturbance. A monitoring and control program is needed.

Poaceae: *Avena barbata*, *Avena fatua*, *Bromus diandrus*, *Bromus hordeaceus*, *Bromus madritensis* and *Ehrharta longiflora*. All are common weeds of open areas and bird rookeries on most islands. As they colonise otherwise unvegetated land they were not initially considered as serious weeds. However recent work on Lancelin Island suggests they may have contributed to the decline of the critically endangered endemic Lancelin Island skink by filling the open areas used as feeding and basking sites by this lizard. A management program to control these species is being prepared.

*Cynodon dactylon* and *Stenotaphrum secundatum*. Garden escapes on Rottneest Island. Invading *Melaleuca lanceolata* woodlands edging salt lakes, smothering native herbs and shrubs. Controlled by herbicides.

### Dicotyledons

Aizoaceae: *Mesembryanthemum crystallinum*. Largely confined to bird rookeries on many islands and are believed to change soil chemistry to favour this species at the expense of other native herbs. Widespread and not being controlled at present.

Asteraceae: *Carduus pycnocephalus*, *Centaurea melitensis* and *Cirsium vulgare*. Common weeds of disturbed areas of the islands off Perth. These appear to be largely an amenity

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problem (i.e. people don't like walking through them). Numbers decline markedly after disturbance ceases.

*Sonchus oleraceus*, *Sonchus tenerrimus* and *Urospermum picroides*. Common on the drier islands north of Perth. Again these are common disturbance weeds which require monitoring and small scale management in public areas. Their ecological effects are poorly known.

Chenopodiaceae: *Chenopodium album* and *Chenopodium murale*. Very common species on old seabird rookeries. Being monitored in case these species replace grasses when these are removed from Lancelin Island.

Malvaceae: *Lavatera arborea*. This species has invaded four islands in the Perth area and is replacing the native *Lavatera pleibea* var *tomentosa*. The species is being physically removed from Shag Island as part of the management plan for the Shoalwater Islands.

Myrtaceae: *Agonis flexuosa*. This aggressive native species has been introduced to Garden Island, where it is already seeding prolifically. A known weed outside its natural range, seedlings of the planted trees, which have historical significance, will be removed and the trees not replaced.

Solanaceae: *Lycium ferocissimum*. Numerous infestations have been recorded on offshore islands. The most severe infestations being on Lipfert, Orton and the East Beagle islands. Apparently reaches the islands when birds eat the succulent fruits on the adjacent mainland. This summer deciduous species replaces the evergreen native shrub *Nitraria billardierei*, which is used as nursery shelter by seals and their pups. Evidence from Victoria (7) suggests this species is also deleterious to nesting seabirds. Plants are sawn off close to the base using long handed saws, and the stumps painted with herbicide in diesel. Tops are either removed to a beach or the mainland and burnt (when in fruit) or used to provide seed traps to help revegetate the area where they were removed.

*Nicotiana glauca*. This species has invaded *Callitris preissii* woodland on the mainland at Woodmans Point opposite Garden Island. Plants of this species are present in low numbers on the island and have been removed to prevent a similar invasion occurring.

Urticaceae: *Urtica urens*. There is a massive infestation of this species on Tern Island. There are no data on possible causes or effects of this species. Requires monitoring as it is present in much smaller populations on many islands.

One hundred and one species of weeds have been recorded from these islands. Approximately one third of these are considered to require management intervention to lessen their deleterious effects.

The most serious weeds appear to be either shrubs (for example *Lavatera arborea* and *Lycium ferocissimum*) or perennial herbs (for example *Homeria flaccida*, *Myrsiphyllum asparagoides* and *Zantedeschia aethiopica*) which can alter the structure and function of island plant communities.

Control of the major weeds requires a degree of co-ordination as most are distributed across numerous islands and CALM management areas. Each species requires a management program that applies throughout its range. Currently management programs are operating on the large settled islands off Perth. These are slowly working towards integrated programs to deal with current and potential weed problems.

Most of the minor weeds are annual species and are considered of little importance in priority for management. However the implication of gap filling annual grasses (and perhaps the replacement of these when controlled, by the broad-leaved annuals, Chenopods and Thistles) in the decline of the Lancelin Island skink suggest that we need to keep an open mind in assessing

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the threat posed by all naturalised flora. Consequently, the monitoring of minor weeds so that we can respond to the unexpected effects of these species is vital.

Currently CALM Science and Information Division has established databases on the mammals and seabirds of Western Australia's offshore islands. As the plant surveys continue a similar database is being established for the native and naturalised flora. These combined datasets should enable integrated planning to preserve the diverse natural values of our offshore islands from the threat of weeds. The aim should be for pro-active management once we have overcome the current crop of established weeds.

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