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THE  
DEPARTMENT OF  
& LAND MANAGEMENT  
WESTERN AUSTRALIA



020363

# Declared Rare and Poorly Known Flora in the Central Forest Region

by Kim Williams, Andrew Horan, Scott Wood and  
Andrew Webb



2001  
Wildlife Management Program No 33



DEPARTMENT OF  
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WESTERN AUSTRALIAN WILDLIFE MANAGEMENT PROGRAM NO. 33

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Department of Conservation and Land Management  
Locked Bag 104, Bentley Delivery Centre WA 6983

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by Andrew Brown

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Maps ..... Kim Williams

## FOREWORD

Western Australian Wildlife Management Programs are a series of publications produced by the Department of Conservation and Land Management (CALM). The programs are prepared in addition to Regional Management Plans to provide detailed information and guidance for the management and protection of certain exploited or threatened species (e.g. Kangaroos, Noisy Scrub-bird and the Rose Mallee).

This program provides a brief description of the appearance, distribution, habitat and conservation status of flora declared as rare under the Western Australian Wildlife Conservation Act (Threatened Flora) and poorly known flora (Priority Flora) in CALM's Central Forest Region and makes recommendations for research and management action necessary to ensure their continued survival. By ranking the Declared Rare Flora in priority order according to these requirements, Departmental staff and resources can be allocated to those taxa most urgently in need of attention.

Priority Flora that are under consideration for declaration as rare are also dealt with, but to a lesser extent than the Declared Rare Flora. However, the information available should assist in the ongoing work of assessment of their conservation status.

This Program has been approved by the Executive Director, Department of Conservation and Land Management, the Conservation Commission and the Minister for the Environment.

Approved programs are subject to modification as dictated by new findings, changes in species' status and completion of recovery actions.

Information in the Plan was accurate at August 1998.

## ACKNOWLEDGEMENTS

I would like to thank a number of people who have assisted during the prolonged task of producing this document.

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Sue Carroll answered our innumerable questions arising from the WA Herbarium flora databases and Anne Cochrane from the Threatened Flora Seed Centre assisted in field work, training our staff in seed collection techniques and by providing information used in the threat matrix analysis.

A big thank you must go to Graham McCutcheon for his many years of field work and collections across the region which provided the basis for many of the population details contained in the plan and for penning the Botanical History of the region.

Finally special mention must be made concerning the contributions of Scott Wood who commenced as Project Coordinator, compiling the early datasets and first draft of the document before transferring (he must have known something!) and Andrew Horan who picked up the project and has followed it through to completion over the last two years.

*Kim Williams*  
*Program Leader, Nature Conservation*  
*Central Forest Region*

## ABBREVIATIONS

### Shires

|     |                              |
|-----|------------------------------|
| AMR | Augusta Margaret River Shire |
| BOD | Boddington Shire             |
| BOY | Boyup Brook Shire            |
| BRG | Bridgetown Greenbushes Shire |
| BSN | Busselton Shire              |
| BUN | Bunbury City Council         |
| CAP | Capel Shire                  |
| COL | Collie Shire                 |
| DAR | Dardanup Shire               |
| DBK | Donnybrook Balingup Shire    |
| HVY | Harvey Shire                 |
| NAN | Nannup Shire                 |
| WAR | Waroona Shire                |
| WEA | West Arthur Shire            |

### Central Forest Region Districts

|     |                           |
|-----|---------------------------|
| BWD | Blackwood District        |
| MON | Mornington District       |
| SWC | South West Capes District |

### Land Tenure

|         |                                    |
|---------|------------------------------------|
| CP      | Conservation Park                  |
| LNNP    | Leeuwin Naturaliste National Park  |
| NP      | National Park                      |
| NR      | Nature Reserve                     |
| Park    | Parkland Reserve                   |
| PP      | Private Property                   |
| Rail    | Railway Reserve                    |
| Reserve | Executive Director Reserve         |
| Road    | Road Reserve/Main Roads Department |
| SF      | State Forest                       |
| Shire   | Shire Reserve                      |
| Utility | Public Utility                     |
| VCL     | Vacant (Unallocated) Crown Land    |
| Verge   | Road verge – vesting undetermined  |
| Water   | Water Authority Reserve            |

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## PART ONE: INTRODUCTION

### 1. The Need for Management

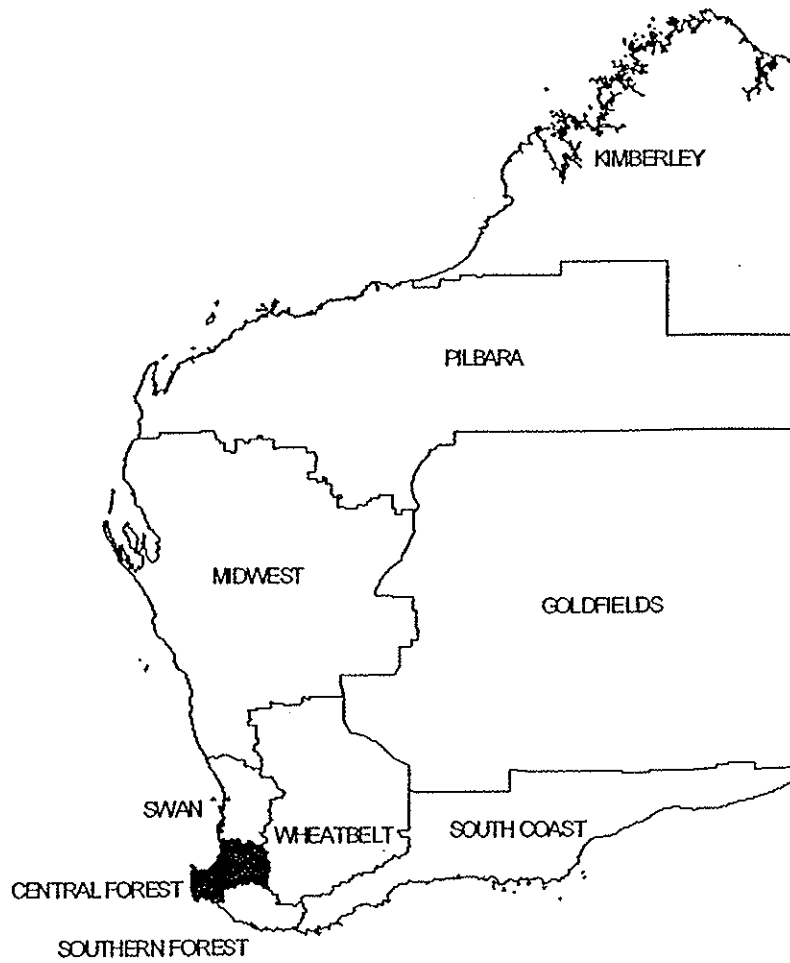
Western Australia has a unique flora, world renowned for its diversity and high level of endemism. WACENSUS, the database of plant names for the State, lists 12,948 current taxa (July 1999) with the total likely to exceed 15,000 species once botanists have completed surveying, searching and describing the flora. A significant proportion of the Western Australian total is concentrated in the south-west of the State, where there is also a large number of endemics due to a long history of isolation and climatic and geological stability (Hopper 1979). According to Briggs and Leigh (1996) the State has 45.9 percent of the Australian total of threatened, rare or poorly known plant taxa, with 79 percent of these restricted to the south west. Nearly 2300 Western Australian taxa are currently listed as threatened or have been placed on the Department of Conservation and Land Management's (CALM) Priority Flora List because they are rare or poorly known.

Although some plants are rare because of their requirement for a specific restricted habitat, the majority have become rare or threatened because of the activities of humans. Extensive land clearing and modification of the environment has resulted in the extinction of some species and threatens the survival of many others. Continued land clearing, plant diseases (particularly due to *Phytophthora* species), exotic weeds and pests, road works, urbanisation, grazing by domestic stock and increasing salinity continue to threaten the flora.

The State Conservation Strategy, *Wildlife Conservation Act 1950*, and *Conservation and Land Management Act 1984* provide the guidelines and legislative basis for the conservation of the State's indigenous plant and animal species. The Department of Conservation and Land Management (CALM) is responsible for the administration of the *Wildlife Conservation Act*, and hence, is responsible for the protection and conservation of flora and fauna on all lands and waters throughout the State. Section 23F of the Act gives the Minister responsible for the Act statutory responsibility for the protection of those plant taxa declared to be rare as defined by the Act.

This Wildlife Management Program collates the available biological and management information on the Declared Rare Flora, and Priority One, Two and Three (poorly known) taxa of CALM's Central Forest Region, as at February 1998. In December 1997, 316 extant taxa were listed as Declared Rare Flora and a further 27 species were listed on the Schedule as Presumed Extinct. In addition to those that were declared rare, 1959 taxa were listed on CALM's Priority Flora List as at December 1997. The majority of these taxa require further detailed survey to accurately assess their conservation status while others are rare, but not currently threatened, and require ongoing monitoring. Brown *et al.* (1998) provides illustrations of Declared Rare Flora as at 1998, discuss the conservation of Western Australia's threatened plant species and review the relevant legislation, and the policy, research and management activities of CALM.

The Central Forest Region covers some 1.80 million ha of which approximately half has been cleared for agriculture, particularly on the western side (Swan Coastal Plain) and the eastern fringe of the region. Figure 1 shows the location of the Central Forest Region in relation to the CALM Management Regions of the State.



**Figure 1. Location of the Central Forest Region in relation to other CALM Management Regions of the State**

## 2. Objective of the Program

The objective of this program for the Central Forest Region is:

To ensure and enhance, by appropriate management, the continued survival in the wild of populations of Declared Rare Flora and other plants in need of special protection.

It aims to achieve this by:

- providing a useful reference for CALM staff and other land managers for the day to day management and protection of Declared Rare Flora populations and populations of other taxa that are poorly known and may be at risk;
- directing Departmental resources within the Region to those species most urgently in need of attention;
- assisting in the identification of Declared Rare Flora and other species potentially at risk, and their likely habitats; and
- fostering an appreciation and increased awareness of the importance of protecting and conserving Declared Rare Flora and other species potentially at risk or in need of special protection.

## 3. Rare Flora Legislation and Guidelines for Gazettal

The *Wildlife Conservation Act 1950* provides for the protection of all classes of indigenous flora throughout the State. Protected flora includes:

Spermatophyta - flowering plants, conifers and cycads  
Pteridophyta - ferns and fern allies  
Bryophyta - mosses and liverworts  
Thallophyta - algae, fungi and lichens

Section 23F of the Act provides special protection to those taxa (species, subspecies, varieties, hybrids) considered by the Minister to be:

- In danger of extinction - the taxon is in serious risk of disappearing from the wild state within one or two decades if present land use and other causal factors continue to operate;
- Rare - less than a few thousand adult plants of the taxon existing in the wild;
- Deemed to be threatened and in need of special protection - the taxon is not presently in danger of extinction but is at risk over a longer period through continued depletion, or occurs largely on sites likely to experience changes in land use which could threaten its survival in the wild;

or

- Presumed Extinct - taxa which have not been collected, or otherwise verified over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently.

In addition, hybrids or suspected hybrids which satisfy the above criteria also must be:

- a distinct entity, that is, the progeny are consistent with the agreed taxonomic limits for that taxon group;

- capable of being self-perpetuating, that is, not reliant on the parental taxa for replacement; and
- the product of a natural event, that is, both parents are naturally occurring and cross fertilisation was by natural means.

Protection under Section 23F is achieved by declaring flora to be 'rare flora' in a notice published in the Government Gazette. CALM's Policy Statement No. 9 discusses the legislation relating to Declared Rare Flora and outlines the criteria for gazettal.

Under the provisions of Section 23F, the 'taking', by any person, of Declared Rare Flora is prohibited on any category of land throughout the State without the written consent of the Minister. A person breaching the Act is liable to a penalty of up to \$10,000. The legislation refers only to wild populations and applies equally to government officers and private citizens on public and private lands.

'To take' in relation to any flora includes 'to gather, pluck, cut, pull up, destroy, dig up, remove or injure the flora or to cause or permit the same to be done by any means'. This includes not only direct destruction or injury by human hand or machine but also such activities as allowing grazing by stock, introducing pathogens, altering water tables so as to inundate or deprive the flora of adequate soil moisture, allowing air pollutants to harm foliage, and burning.

The Schedule published in the Government Gazette is revised annually to accommodate additions and deletions to the list of Declared Rare Flora. To qualify for gazettal, plants must satisfy certain requirements as defined in Policy Statement No. 9, namely:

- the taxon (species, subspecies, variety) must be well defined, readily identifiable and represented by a voucher specimen in a State or National Herbarium. It need not be formally described under conventions in the International Code of Botanical Nomenclature, but such a description is preferred and should be undertaken as soon as possible after listing on the Schedule;
- the taxon must have been thoroughly searched for in most likely habitats in the wild by competent botanists during the past five years; and
- searches have established that the plant in the wild is either rare, endangered or deemed to be threatened and in need of special protection, or it is presumed extinct.

Plants may be deleted from the Declared Rare Flora Schedule where:

- recent botanical survey has shown that the taxon is no longer rare, endangered or otherwise in need of special protection;
- the taxon is shown to be a hybrid that does not comply with the inclusion criteria;

or

- the taxon is no longer in danger of extinction because it has been adequately protected by reservation of land on which it occurs or because population numbers have increased beyond the danger point.

#### **4. CALM's Priority Flora List**

CALM maintains a Priority Flora List to determine priorities for survey of plants of uncertain conservation status. The List comprised 1959 taxa (July 1998) that are poorly known and in need of high priority survey or are adequately surveyed but in need of monitoring. The poorly known taxa are possibly at risk but do not meet the survey requirements for gazettal as Declared Rare Flora (DRF), as outlined in Policy Statement No. 9. Only

those plants considered to be threatened or presumed extinct on the basis of thorough survey can be included on the Declared Rare Flora Schedule.

The Priority Flora List is divided into the following categories according to the degree of perceived threat.

#### Priority One - Poorly Known Taxa

**Taxa which are known from one or a few (generally <5) populations which are under threat**, either due to small population size, or being on lands under immediate threat, eg. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, eg. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

#### Priority Two - Poorly Known Taxa

**Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat** (ie. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

#### Priority Three - Poorly Known Taxa

**Taxa which are known from several populations, at least some of which are not believed to be under immediate threat** (ie. not currently endangered). Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey.

#### Priority Four - Rare Taxa

**Taxa which are considered to have been adequately surveyed and which, while being rare (in Australia), are not currently threatened by any identifiable factors.** These taxa require monitoring every 5-10 years.

### 5. Responsibilities within the Department

- Reviewing Departmental policy on Declared Rare Flora is the responsibility of the CALM Corporate Executive;
- Identification of Declared Rare Flora is the initial responsibility of Herbarium staff, but should, with appropriate training, become a Regional responsibility also;
- Locating Declared Rare Flora is the responsibility of CALMScience Division, Nature Conservation Division and Regional Services Division ;
- Determination of land status and preparation of material for notification to landowners is the responsibility of Wildlife Branch;
- Hand-delivered notification to landowners of Declared Rare Flora populations is the responsibility of Regional staff and Wildlife Branch;
- Maintenance of Declared Rare Flora information and database, and dissemination of these data are the responsibility of Wildlife Branch;

- Advice on management prescriptions is the responsibility of CALM Science Division staff, Program Leaders, (Regional Services Division); the Principal Botanist, Wildlife Branch and Western Australian Threatened Species and Communities Unit (WATSCU) (Nature Conservation Division);
- Coordination of Recovery Plans and Interim Recovery Plans for threatened taxa is the responsibility of WATSCU.
- Management, protection and regular inspection of Declared Rare Flora populations is the responsibility of staff of the Central Forest Region;
- Enforcement matters relating to the provisions of the Wildlife Conservation Act are the responsibility of Wildlife and Regional Services Officers in the Central Forest Region;
- Implementation and revision of the management program is the responsibility of the Central Forest Region Threatened Flora and Communities Recovery Team.

## **6. The Central Forest Region**

The CALM Central Forest Region is centred on Bunbury and extends along the west coast for approximately 60km north to Yalgorup and Waroona, 130 km south to Augusta and along the Southern Ocean to Black Point, Vasse Highway and the Blackwood River and east to Darkan and Kulikup. The Region is approximately 165 km across at its widest point.

The Central Forest Region is bounded to the north by Swan Region with the Wheatbelt Region to the east and the Southern Forest Region to the south east. There are six Shires included entirely within the boundaries of the Region (Collie, Augusta-Margaret River, Busselton, Donnybrook-Balingup, Dardanup and Capel) plus the City of Bunbury and parts of eight shires (Waroona, Harvey, Boddington, Williams, West Arthur, Boyup Brook, Nannup and Bridgetown-Greenbushes)

The Region covers an area of 1.80 million ha of which 0.78 million ha (44 percent) is land managed by CALM and a further 0.04 million ha (2 percent) is unvested land managed by CALM. The region includes three national parks and 46 (existing or proposed) nature reserves, 19 (existing or proposed) conservation parks and approximately 744 000 ha of state forest managed by CALM. It includes the Abba Flats, Donnybrook Sunklands and Scott Plains, areas long recognised for their diverse flora, with an exceptionally high number of rare and endemic species.

### 6.1 Climate

The region experiences a Mediterranean climate characterised by a cool, wet winters and hot, dry summers, with a moderately reliable rainfall. Average annual rainfall varies from about 600mm along the eastern boundary of the region, to a maximum of over 1250mm between Harvey and Collie. The Bureau of Meteorology (1965) gives a detailed account of the key climatic features of the region.

### 6.2 Geology, Landforms and Soils

The region can be divided into five main geomorphic units or natural regions according to Beard (1981), based on Clarke (1926). These are: the Darling Plateau, Swan Coastal Plain, Leeuwin- Naturaliste Ridge, Blackwood Plateau, Scott Coastal Plain. The Darling Scarp separates the Darling Plateau from the Swan Coastal Plain and Blackwood Plateau (Donnybrook Sunklands) and the Whicher Scarp separates the Blackwood Plateau from the Swan Coastal Plain.

The Darling Plateau is an ancient erosion surface that is at an average elevation of about 250 m above sea level in the region, with a range from under 100 m up to 574 m at Mt Saddleback. Composed of Precambrian crystalline rocks, it has been extensively laterised.

The Collie and Wilga Basins are depressions within the Precambrian bedrock, containing Permian sediments including coal measures.

Dissection of the plateau by rivers has led to a variety of valley forms, and soils including red and yellow earths and duplex soils, as described by Churchward and McArthur (1980).

The Swan Coastal Plain extends west from the Darling and Whicher Scarps to the Indian Ocean. It ranges up to about 60m above sea level, and within it a number of geomorphic units can be identified: Quindalup Dunes (nearest the coast), Spearwood Dunes, Bassendean Dunes, Pinjarra Plain and Ridge Hill Shelf (at the foot of the Darling Scarp) (McArthur and Bettenay 1960). This coastal plain is composed of sedimentary rocks of Quaternary age at the surface. The maximum thickness of sediments may exceed 15 000 m.

The Leeuwin-Naturaliste Ridge is composed of Precambrian crystalline rocks capped by laterite and sand. Along the coast dune sand and limestone, overlying the Precambrian rocks, rise to over 200 m above sea level. Numerous caves are developed in the limestone.

The Blackwood Plateau, also known as the Donnybrook Sunlands, has a gently undulating surface covered by lateritic gravel and sand. It typically ranges from 80m to 18 m above sea level and is underlain by Mesozoic sediments and Bunbury Basalt. Much of this area is poorly drained.

The Scott Coastal Plain has an average elevation of about 40 m above sea level and is a swampy area traversed by remnants of linear sand dunes developed approximately parallel to the coastline.

For further details about the geology of the region see the 1:250 000 scale geological maps prepared by Lowry (1967), Wilde and Low (1980) and Wilde and Walker (1982, 1984). Landform and soil information for parts of the region are available from McArthur and Bettenay (1960); Northcote *et al.* (1967); Finkl (1976); McArthur *et al.* (1977); McArthur and Bartle (1980); Churchward and McArthur (1980).

## Hydrology

Major rivers passing through the region include the Blackwood, Collie, Harvey, Margaret, Preston and Brunswick Rivers. The Murray River is to the north of the region but its catchment extends into the region. Most of the flow on forested catchments is fresh. Agricultural clearing has increased the input of salts in many of the lower rainfall (under 900 mm/year) areas. Many of the rivers in the region have been dammed.

There are a number of significant swamps and lakes throughout the region, notably on the Swan and Scott Coastal Plains and in the Yourdamung area. Extensive areas are irrigated, notably between Dardanup and Waroona.

Substantial underground water resources are available within the region, notably from the Perth and Collie Basins (Wilde and Walker 1982), but some of this water is not fresh.

### 6.3 Vegetation

The vegetation of the region has been mapped by Beard (1981). Site-vegetation mapping by Heddle *et al.* (1980) and by Matiske (1998) is also available for most of the region. The latter mapping is to a large extent based on the landform, site, vegetation work by Havel (1968, 1975 a and b).



Beard's 1981 1:1 000 000 scale vegetation map of the south west identifies 13 vegetation systems in the central forest region, within four botanical subdistricts. A vegetation system is a particular series of plant communities recurring in catenary sequence or mosaic pattern linked to topographic, soil or geological features. Brief descriptions of the 13 vegetation systems are as follows:

### **Drummond Subdistrict (on Swan Coastal Plain)**

#### **Rockingham System**

This system extends along the coast on the Quindalup Dunes, as far south as Myalup. It consists of dune sands and coastal limestone. Behind the coastal communities there is a heath in which *Acacia cochlearis*, *Olearia axillaris* and *Scaevola crassifolia* are conspicuous plants. Thickets of *Acacia rostellifera* are often present.

#### **Spearwood System**

This system is found inland of the Rockingham System. It consists of ridges of limestone, often mantled with yellow sand. The principal vegetation is Eucalypt woodland. Numerous lakes and swamps occur in chains parallel to the coast. Species commonly present include Tuart (*Eucalyptus gomphocephala*), jarrah (*E. marginata*) and peppermint (*Agonis flexuosa*) in woodland and *Melaleuca preissiana*, *M. raphiophylla* and *Banksia littoralis* in swamps.

#### **Bassendean System**

This system stretches discontinuously for the whole length of the Swan Coastal Plain, inland of the Spearwood System. Low *Banksia* woodland is common on drier sites, dominated by *Banksia attenuata*, *B. menziesii* and *B. ilicifolia*. On moister sites jarrah-marri (*Corymbia calophylla*) woodland with *Banksia* and sheoak (*Allocasuarina fraseriana*) understorey is common.

#### **Pinjarra Plain System**

The plain occupies a more or less continuous band along the foot of the Darling Scarp, varying in width from 1 to 25 km. Marri woodland or forest was originally common with jarrah on higher ground. Flooded gum (*E. rudis*) occurs in the wetter parts. Ground subject to frequent flooding, such as at Benger Swamp, supports low woodland or forest of *Melaleuca raphiophylla*, thickets of *M. preissiana* or sedgeland.

#### **Ridge Hill Shelf System**

This system covers a narrow discontinuous band along the foot of the Darling Scarp. The principal element is forest of jarrah and marri often mixed with wandoo (*E. wandoo*) on heavier gravelly soils or sheoak on sandier soils.

### **Dale Subdistrict (Northern Darling Plateau)**

#### **Darling System**

This comprises the Northern Jarrah Forest, which occupies the most humid portion of the Darling Plateau. The major catena in the system comprises: open vegetation of 'granite' rock outcrops, protruding through the laterite mantle; jarrah forest on the laterite plateau; marri-wandoo woodland on the younger red soils of the scarp and the eastern valleys; flooded gum and paperbark (*Melaleuca raphiophylla*) along the water courses.

Minor catenas occur within the jarrah forest and have been documented by Havel (1975) as 'site-vegetation types' and mapped over much of the region by Heddle *et al.*, (1980).

#### **Bannister System**

Occupies a north-eastern section of the region. The typical catena is jarrah-wandoo woodland on the ridges and marri-wandoo woodland on the slopes.

### **Williams System**

This system is found in the north-east of the region. The proportion of lateritic ridges is less than in the Bannister System. Marri-wandoo woodland predominates, with York gum (*E. loxophleba*) on the lower ground and jarrah-marri-wandoo woodland on the ridges.

### **Menzies Subdistrict (Southern Darling Plateau)**

#### **Bridgetown System**

This system extends north of the karri forest to near Collie. Jarrah-marri forest is the main element. In the west, yarri/blackbutt (*E. patens*) and bullich (*E. megacarpa*) occurs in some of the valleys and flooded gum and paperbark along some of the water courses. In swamps, particularly in the Collie Basin, low woodlands of flooded gum, *Melaleuca preissiana* and/or *Banksia* species are found.

#### **Chapman System**

Occupies the Sunlands, west of the Darling Fault. The general cover is of jarrah-marri forest, frequently stunted. Low woodland of *Melaleuca preissiana* and *Banksia* species occupies damp sites. Shallow uplands soils may carry stunted jarrah and black grasstrees (*Kingia australis*).

#### **Beaufort System**

This system is found in the south-east corner of the region. Laterite residuals carry wandoo, jarrah and mallet (*E. astringens*). Slopes have marri and wandoo woodland. York gum, swamp yate (*E. occidentalis*) and scrub heath occur in valley floors.

#### **Boranup System**

Extends from Cape Naturaliste to Cape Leeuwin and along the south coast. On exposed western slopes *Pimelea ferruginea* heath or thicket occurs. With decreasing exposure peppermint and/or *Banksia* dominate. On stabilized dunes, karri (*E. diversicolor*) and jarrah forest or woodlands of marri, yate (*E. cornuta*) or peppermint may be found.

#### **Scott River System**

Located between the Boranup and Chapman Systems, parallel and just inland from the south coast. Low woodland of jarrah and *Banksia* with *Melaleuca* and an understorey of small shrubs is common on sand dunes. Wetter areas have rush and sedges.

## **7. Botanical Exploration and Study in the Central Forest Region**

Though the first, few collections of indigenous plants from Western Australia were made by William Dampier in the year of 1688, it was not until 1801 that plants in the currently designated Central Forest Region became known to a European botanist. In that year Leschenault de la Tour, voyaging with Nicholas Baudin in the vessels 'Geographe' and 'Naturaliste', made collections around the bay they named after the former ship, before proceeding northwards. Late in the same year the British ship 'Investigator', commanded by Mathew Flinders, made landfall at Cape Leeuwin, but no landing was made there (Flinders 1814).

Following settlement at the Swan River and further south from 1829, the frequency and intensity of collection increased. Between 1830 and 1843 Georgiana Molloy collected around Augusta and Busselton and by 1842 the explorations of James Drummond had taken him several times to the Vasse district. On a longer, subsequent journey with John Gilbert he traversed along the Darling Range, where for some reason he was unable to visit Mt. Saddleback as he had planned, then went on to Cape Naturaliste and through to Cape Leeuwin and Augusta. From there they intended to travel to Albany, however, they found their way barred by a bewildering maze of swamps and turned back (Erickson 1969). In the years 1838 to 1842, visiting Austrian botanist Ludwig Preiss made large collections in the Darling Range and the Busselton/Geographe Bay area, as well as elsewhere.

In 1877 Baron Ferdinand von Mueller, the Victorian Government Botanist, reported on forests in Western Australia and employed local collectors George Maxwell and Augustus Frederick Oldfield. Other

significant amateur collectors for him were Anne Mary McHard and Miss Irvine at Geographe Bay and the Blackwood region, and James Forrest in the Blackwood region. Extensive collection continued between October, 1900 and December, 1901, when the German botanists Ludwig Diels and Ernst Pritzel covered virtually all of the land that was accessible at that time through agricultural and mining settlements. Though mainly interested in plant geography they did later describe two hundred and thirty-five species.

Government interest in the botany of the State resulted in the 1897 appointment of Dr. A. Morrison, and later Dr. F. Stoward and Mr. W.M. Carne as Government Botanist. By 1920 Mr. C.A. Gardner was appointed as a collector and he continued to collect widely throughout his career. His influence was extended through his appointment as Government Botanist in 1927, and resulted in the founding of the State Herbarium and his cultivation of collaborators. This practice has continued to the present day, with both lay contributors and professionals in various institutions.

Among the early collaborators, medical Dr. W.E. Blackall was outstanding, his wide knowledge and collections allowing him to commence development of a key to the identification of the flora. After his death this was made available to and developed by then Professor (now Emeritus Professor, Dr.) B.J. Grieve and his associates, who published the various volumes as 'How to Know Western Australian Wildflowers'. This publication greatly facilitated 'botanising' by the inhabitants of the State and resulted in contributions to the knowledge of the flora by many amateur botanists.

Compilation of a list of poorly collected and presumably rare vascular plants in Western Australia by .G. Marchant and G.J. Keighery in 1979, and an Australia-wide list published contemporaneously, focussed attention on such species. Botanists mainly within the Departments of Agriculture and Fisheries and Wildlife (now CALM) have established the rarity of many species and discovered many new and rare taxa. This effort has been supplemented by some of the numerous botanical surveys commissioned by land use proponents in compliance with requirements of the Environmental Protection Authority. The Central Forest Region Threatened Flora Plan has utilised information from many of these sources, during its development.

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## PART TWO: DECLARED RARE FLORA IN THE CENTRAL FOREST REGION

In 1998, 49 taxa of Declared Rare Flora were known to be extant within the boundaries of the Central Forest Region. Of these 43 taxa, 26 (60%) are endemic to the Central Forest Region.

A brief description of the morphology, distribution, habitat, and conservation status is provided for each taxon. Where appropriate, the impact of certain factors such as fire, mechanical disturbance, weed invasion and *Phytophthora* dieback is noted from observations made in the field during routine monitoring and from discussion with District and research staff. Where appropriate recommendations are made for management and protective action to ensure the continued survival of populations.

Descriptions of taxa were compiled by consulting references and from discussion with botanists. Distribution and habitat data were recorded from Departmental Rare Flora files, records in the Western Australian Herbarium and field inspections undertaken by local District and Regional staff. Emphasis was placed on the particular habitat characteristics of locations in the Central Forest Region. Conservation status was determined from field observations, and population and location data on Departmental files. A brief regional summary of the number and condition of populations throughout the range of the taxon and threats to population survival is provided. A table for each taxon lists the location, land status, date of last survey, number of plants and condition for each population. The list of known populations generally refers to those in the Central Forest Region only, populations which occur outside the Region are not listed but referred to in the description of the species' distribution. The plan is not restricted to populations which have been recently surveyed, but also includes those represented only by a Herbarium specimen if they are from a different locality and contain sufficient locational detail to enable the population to be relocated. Herbarium specimens with vague details such as: Locality - "Blackwood River" have not been included in this document.

Precise locality details are contained on Departmental files, computerised databases and Geographic Information Systems.

During the course of compiling this report 17 new populations of Declared Rare Flora and 44 new populations of Priority Flora have been discovered.

## DECLARED RARE FLORA

## *Boronia exilis* P.G. Wilson

RUTACEAE

Scott River Boronia

*B. exilis* is part of the *Boronia juncea* complex, but is a taller, more slender plant, with pale pink, almost white flowers. *B. exilis* is an erect slender-stemmed perennial to approximately 1 m high. Its upper leaves are slender and almost round in cross-section, to 1.5 cm long. The pink flowers are borne in clusters of 3 to 9 at the end of branches. Each flower has four 4 mm long deep red, woolly sepals and four broadly ovate pink petals to 7 mm long. The specific name *exilis* is Latin and means slender and weak, referring to the stems of this species. *B. exilis* is similar to *B. juncea*, and particularly to the subsp. *laniflora*. It is most easily distinguished by its strongly fringed staminal filaments, which in *B. juncea* are hairless (Wilson, 1998).

**Flowering Period:** September

### **Distribution and Habitat**

Apparently confined to the Scott Plain, where it occurs in heath or sedgelands on shallow sands over ironstone. Vegetation at Beenup in which the species was located was described as open low *Banksia attenuata*/*B. ilicifolia*/*Eucalyptus marginata* woodland, mixed Proteaceae/Myrtaceae scrub, and low sedgeland with pockets of low open Proteaceous/Myrtaceous heath.

### **Conservation Status**

Declared Rare Flora - Critically Endangered

### **Known Populations**

| Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1a Brennan Bridge  | SWC      | AMR   | Road        | 19.9.96     | 100           | good      |
| 1b Brennan Bridge  | SWC      | AMR   | Shire       | 17.9.99     | 1000+         | good      |
| 1c Brennan Bridge  | SWC      | AMR   | Shire       | 17.9.99     | 1000+         | good      |
| 2 Scott NP         | SWC      | AMR   | NP          | 17.9.99     | 50-100        | good      |
| 3 McGregor         | SWC      | AMR   | NR          | -           | -             | good      |
| 4 Beenup           | SWC      | AMR   | PP(BHP)     | 17.9.99     | 50-70         | good      |
| 5 Chester          | SWC      | AMR   | SF          | -           | -             | poor      |
| 6 Alexandra Bridge | SWC      | AMR   | Shire       | 25.9.99     | 50-100        | good      |

### **Response to Disturbance**

Fire appears to kill adult plants and does not stimulate germination.

### **Susceptibility to *Phytophthora* Dieback**

Thought to be sensitive.

### **Management Requirements**

Further survey between the Scott Plain and Black Point as suggested by G. Keighery.

### **Research Requirements**

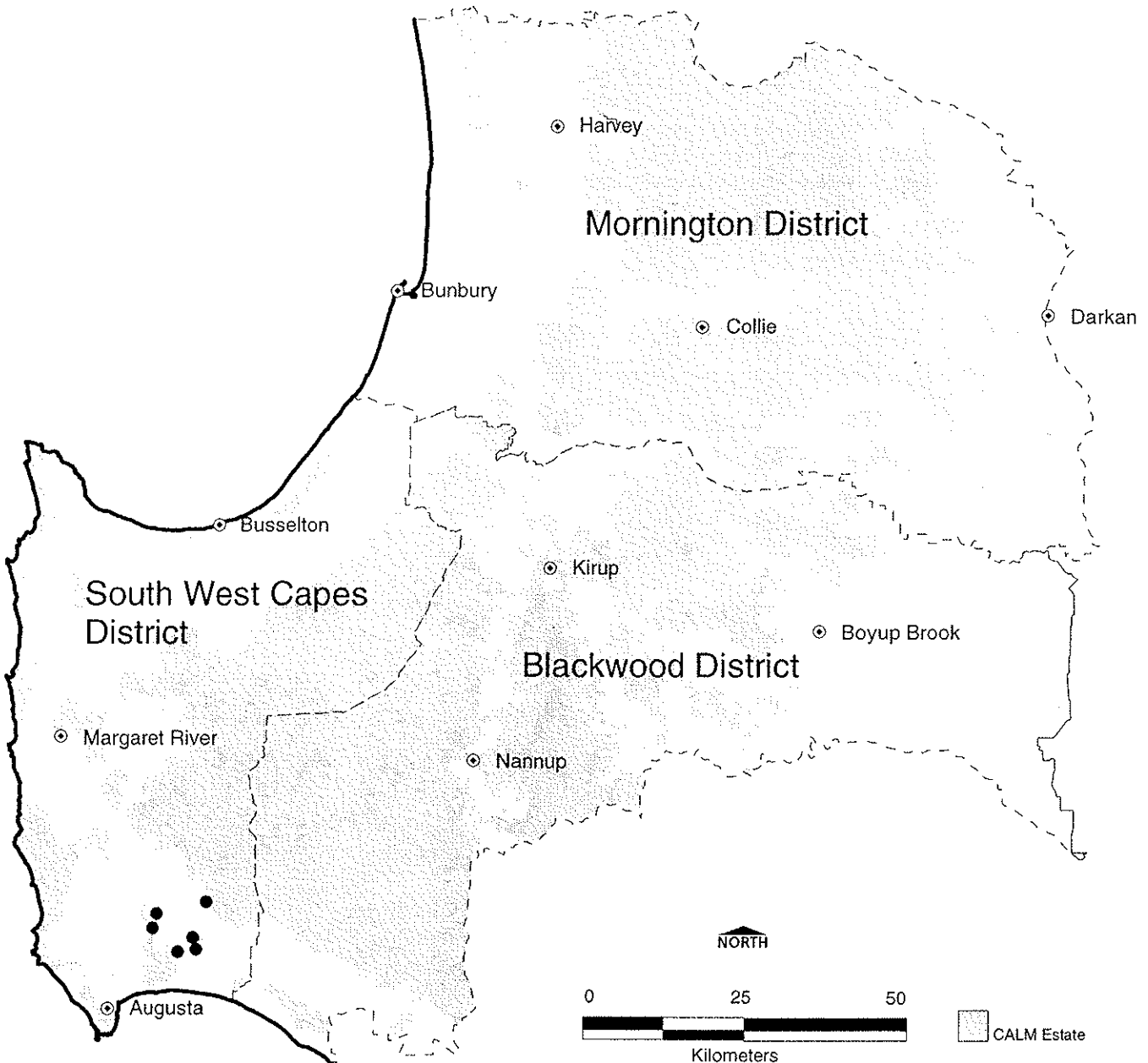
Response to soil disturbance, weed invasion, fire and *Phytophthora*.

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# Central Forest Region Threatened Flora Management Plan



● **Boronia exilis**

## *Brachysema modestum* Crisp

## PAPILIONACEAE

*B. modestum* is a distinctive low, spreading shrub which grows up to 1.5 m wide. The large, ovate, glossy, dark green leaves form a dense cover at ground level. Pea shaped flowers which are pale pink to cream in colour are located at the end of stems in loosely arranged flower heads. These lie flat on the ground and are hidden beneath the foliage.

It was first collected in 1970 but was incorrectly identified as *Brachysema minor*. It was subsequently recognised as a separate species during the floristic survey of the Swan Coastal Plain. The species is distinguished from *B. minor* by its predominantly cream flowers and more robust, larger leaves.

**Flowering Period:** September to November

### Distribution and Habitat

At present *B. modestum* is known from only two locations. The first of these is growing on grey sand adjacent to an ironstone outcrop in the north east of Treeton Block. The total number of plants is unknown as the species' clonal growth habit results in a dense cover of the forest floor. However the entire area of cover is approximately 5 hectares. The dominant overstorey within the area is low Jarrah and Marri forest. The second population occurs along an ironstone creek system within Quilergup Forest Block. The overstorey is again a Jarrah Marri forest with various *Melaleuca* species present. The population adjoins a pine plantation and is at risk of disturbance from pine harvesting operations.

In Treeton Block the species grows in association with *Chamelaucium erythrochlorum* ms, also Declared Rare Flora. Extensive surveys conducted throughout the Treeton area from 1992 to 1994 failed to locate additional populations. The soil on which the Treeton population occurs is rapidly drying clay. This land unit is found at the base of the Whicher Range but has been largely cleared.

### Conservation Status

Declared Rare Flora - Vulnerable

The main reason for the species decline is thought to be drastic reduction of habitat. The Swan Coastal Plain Ironstone community type with which *B. modestum* is associated, has been massively impacted by vegetation clearing. This community is now ranked as critically endangered.

### Known Populations

| Population        | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Treeton Block   | SWC      | BSN   | SF          | 15.11.96    | 100's         | good      |
| 2 Quilergup Block | SWC      | BSN   | SF          | 27.12.96    | 1000's        | good      |

### Response to Disturbance

The species may be fire resistant as the area has a history of regular burning. It is possible that the species may benefit from autumn burns as they may cause germination of seed stored within the soil. Keighery noted that the related species, *B. papilio* has regenerated from seed and rootstock following a fire in 1993. Both populations of *B. modestum* are within a fire exclusion zone for prescribed burning.

Discolouration and leaf curl, similar to a rust infection, is evident on many of the plants. The sprawling carpet-like coverage may indicate vegetative regeneration.

### Susceptibility to *Phytophthora* Dieback

Probably resistant, as the area is infected but there is no evidence of an effect on the population.

### Management Requirements

Interim Wildlife Management guidelines have been developed for the species and recommend the following:

1. Placement of DRF markers.
2. Minimise access - at present the area is accessible via a service track which has been used for horse riding.
3. Collection and storage of propagation material.
4. Further survey work, particularly of known *Chamelaucium erythrochlorum* ms locations.
5. Cryostorage of genetic variants that are identified.
6. Localised publicity campaign.

7. Conservative fire regime.
8. Excision of portion of State Forest to Nature Reserve.
9. Investigation of translocation sites.
10. Monitoring.
11. Scientific research.

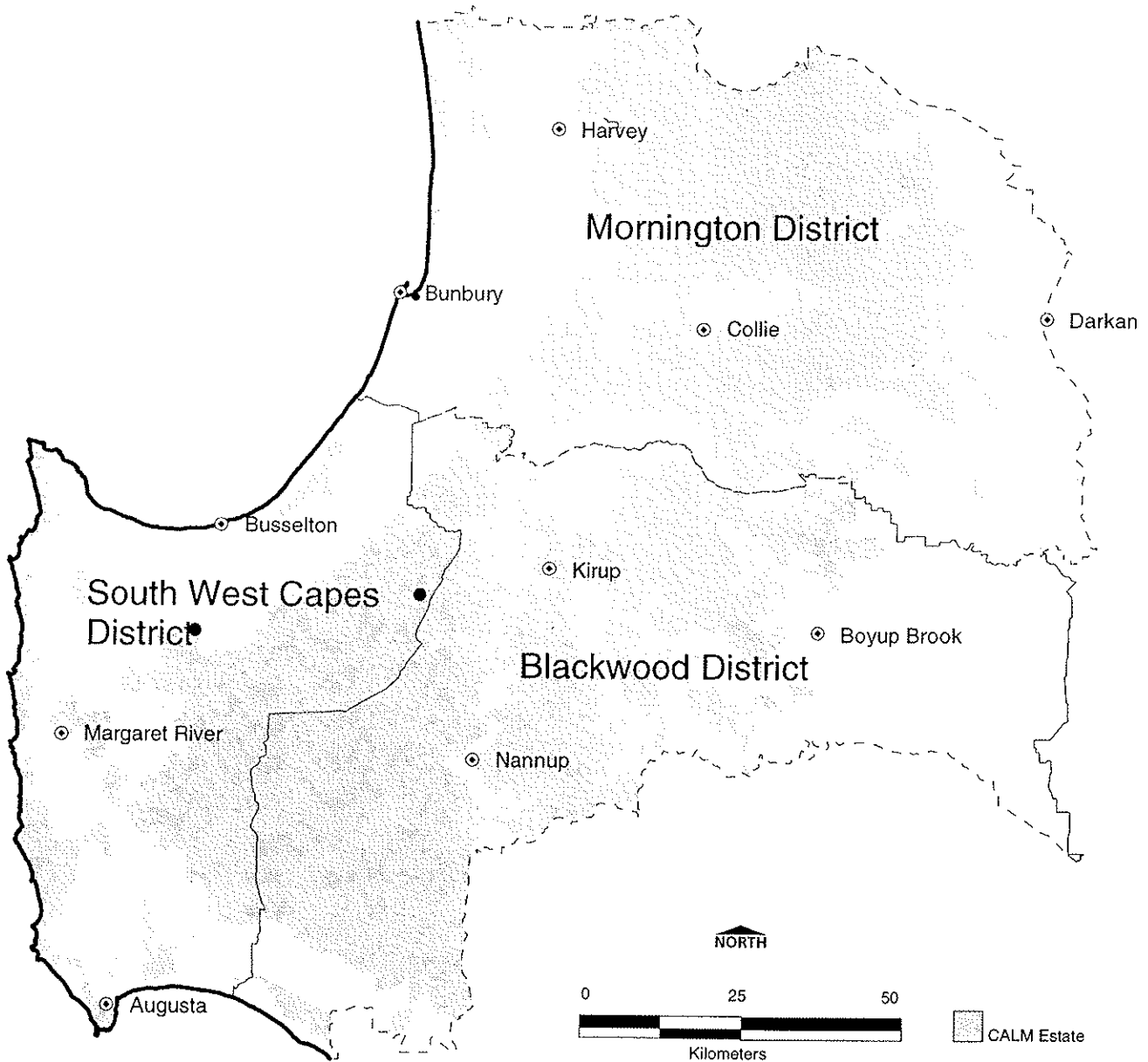
#### **Research Requirements**

1. Definition of genetic variation within the population so that any variants can be put into cryostorage.
2. Development of rapid and reliable propagation methods of vegetative and seed stock. At present the six plants have been successfully propagated by the Botanic Garden and Parks Authority.
3. Ascertain the level of stored seed in soil. No seed has yet become available for collection.
4. Development of rapid, reliable germination techniques to provide revegetation stock or seed.

#### **References**

- Gibson, N., Keighery, B.J., Keighery, G.J., Burbidge, A.H. and Lyons, M.N. (1994) *A floristic survey of the Swan Coastal Plain*. Unpublished Report for the Australian Heritage Commission prepared by Department of Conservation and Land Management and the Conservation Council of Western Australia.
- Papenfus, D. (1995) *Interim Wildlife Management Guidelines for 19 Critically Threatened Western Australian Taxa, Guideline 7: Brachysema modestum*. Department of Conservation and Land Management, Western Australia.

# Central Forest Region Threatened Flora Management Plan



● **Brachysema modestum**

## *Brachysema papilio* Crisp

## PAPILIONACEAE

*B. papilio* is an upright bush growing to 1.5 m in height. Initially spindly, the plant becomes dense as it matures. The leaves are distinctively butterfly shaped, tipped with sharp points and grow to 20 mm wide. The flowers are pea shaped, pale red to cream in colour and hang attractively in loose inflorescences at the end of stems.

It was only discovered in 1991 during the Swan Coastal Plain floristic survey. It closely resembles *B. praemorsa*, but can be distinguished by differing flowering times. *B. papilio* flowers between September and November rather than February to March.

**Flowering Period:** September to November

### Distribution and Habitat

Only one population is known from the Abba State Forest block near Busselton. *B. papilio* appears as a dominant shrub on very shallow red sandy-clay soil over ironstone. The area is wet in winter. Vegetation ranges from dense heath with *Melaleuca* spp., *Mesomelaena* spp. and *Stirlingia* spp. to low open scrub with *Hakea* aff. *varia* over sedgeland.

### Conservation Status

Declared Rare Flora – Critically Endangered

The main reason for the species decline is thought to be the drastic reduction in its specific habitat. The Swan Coastal Plain ironstone community type, with which *B. papilio* is associated, has been massively impacted by vegetation clearing and is now ranked as critically endangered.

The known population is susceptible to weed invasion and grazing given its exposure on two sides by pasture, although at present the population appears healthy and free of weeds. Fencing is adequate. Mining exploration licenses are current for the adjacent area of State Forest and some drilling has occurred. Sand mining has the potential to modify the habitat through hydrological changes.

### Known Populations

| Population   | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Abba Block | SWC      | BSN   | SF          | 19.11.96    | 200+          | moderate  |

### Response to Disturbance

Killed by fire which apparently stimulates seed regeneration. Too frequent burning would be deleterious.

### Susceptibility to *Phytophthora* Dieback

Unknown; infection is present in this location and the site has had three aerial applications of Phosphite to inhibit the spread of the disease.

### Management Requirements

Interim Wildlife Management guidelines were developed in 1994 for the population that contain recommended actions as follows:

1. Consultation with mining companies – Done.
2. Placement of DRF markers – Done.
3. Liaison with adjoining land owners to minimise the risk of grazing and to allow vehicular access via these properties. Done
4. Collection and storage of seed - Done
5. Conversion of State Forest to Nature Reserve.
6. Collaboration with the Botanic Garden and Parks Authority
7. Application of a conservative fire regime. Exclusion zone implemented.
8. Further survey - Done
9. Localised publicity campaign
10. Investigation of translocation sites
11. Monitoring - Done
12. Scientific research

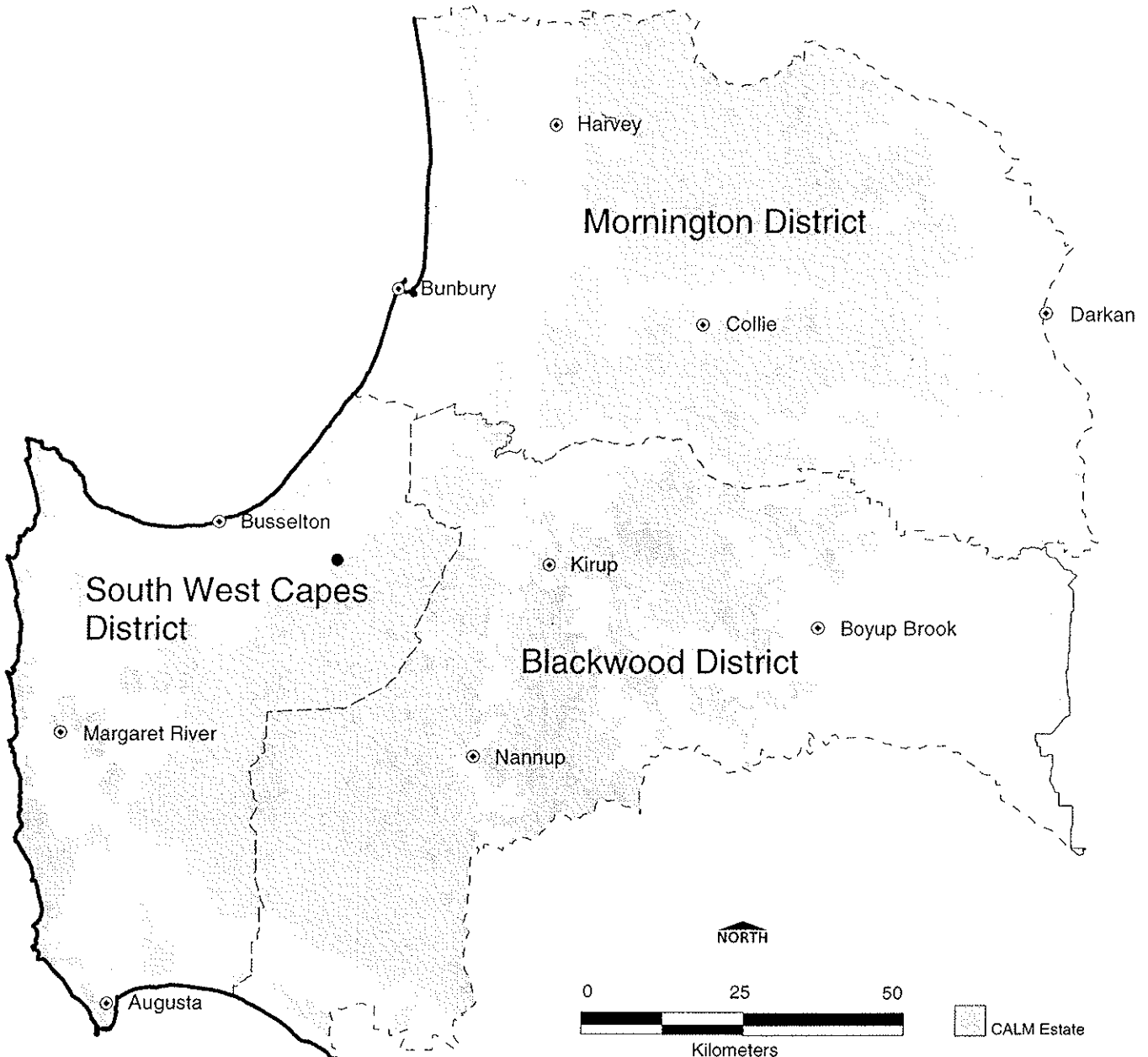
### **Research Requirements**

1. Definition of genetic variation within the population so that any variants can be put into cryostorage.
2. Development of rapid and reliable propagation methods from vegetative and seed stock.
3. Ascertain the level of stored seed in soil.

### **References**

Papenfus, D. (1995) *Interim Wildlife Management Guidelines for 19 Critically Threatened Western Australian Taxa, Guideline 6: Brachysema papilio* ms. Department of Conservation and Land Management, Western Australia.

# Central Forest Region Threatened Flora Management Plan



● **Brachysema papilio**

## *Caladenia bryceana* R.S. Rogers subsp. *bryceana* ms

## ORCHIDACEAE

### Dwarf Spider Orchid

Rarely exceeding 9 cm in height, this species is one of the smallest orchids found in W.A. Consequently it is not easily noticed in new locations and often difficult to relocate in known locations even in sparse vegetation. It has an unusually large leaf which is often equal in length to the complete plant. Its dainty flowers are usually green, but occasionally apricot, and a band of glossy, dark, globular calli (hair like appendages) run down the centre of the labellum. The sepals are evenly curved, lacking a distinct kink and broadening of the lamina.

It differs from subsp. *cracens* in its more colourful flowers, the lack of curling at the margins of the sepals and petals, and the presence of darker, more globular calli all along the centre line of the labellum rather than being absent in the middle portion. *C. bryceana* subsp. *bryceana* also has a more southern distribution and a slightly later flowering period.

**Flowering Period:** August to early October.

### Distribution and Habitat

Known from three populations between Boxwood Hills and the Stirling Ranges, with a further occurrence near Boyup Brook. Habitat ranges from open Wandoo woodland to Mallee shrubland adjacent to watercourses.

### Conservation Status

Declared Rare Flora – Critically Endangered

### Known Populations

| Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Wild Horse Swamp | MON      | WEA   | NR          | 1999        | 50            | good      |

### Response to Disturbance

The response of *Caladenia bryceana* subsp. *bryceana* ms to summer fire (December-early May) is unknown. It is likely that the orchid would be killed by fire during its active growing period (late May-early November).

### Susceptibility to *Phytophthora* Dieback

Unknown, however there is no evidence that *Caladenia* species are susceptible.

### Management Requirements

An extract within files [source indeterminate] states that *C. bryceana* has previously proved unreliable in cultivation and therefore that conservation of wild populations is probably the only means to conserve the species.

### Management requirements include:

1. Implement weed control.
2. Develop a fire management strategy.
3. Collect seed.
4. Conduct further surveys.
5. Monitor population annually.
6. Promote awareness.
7. Obtain biological and ecological information.
8. Develop a translocation proposal.

### Research Requirements

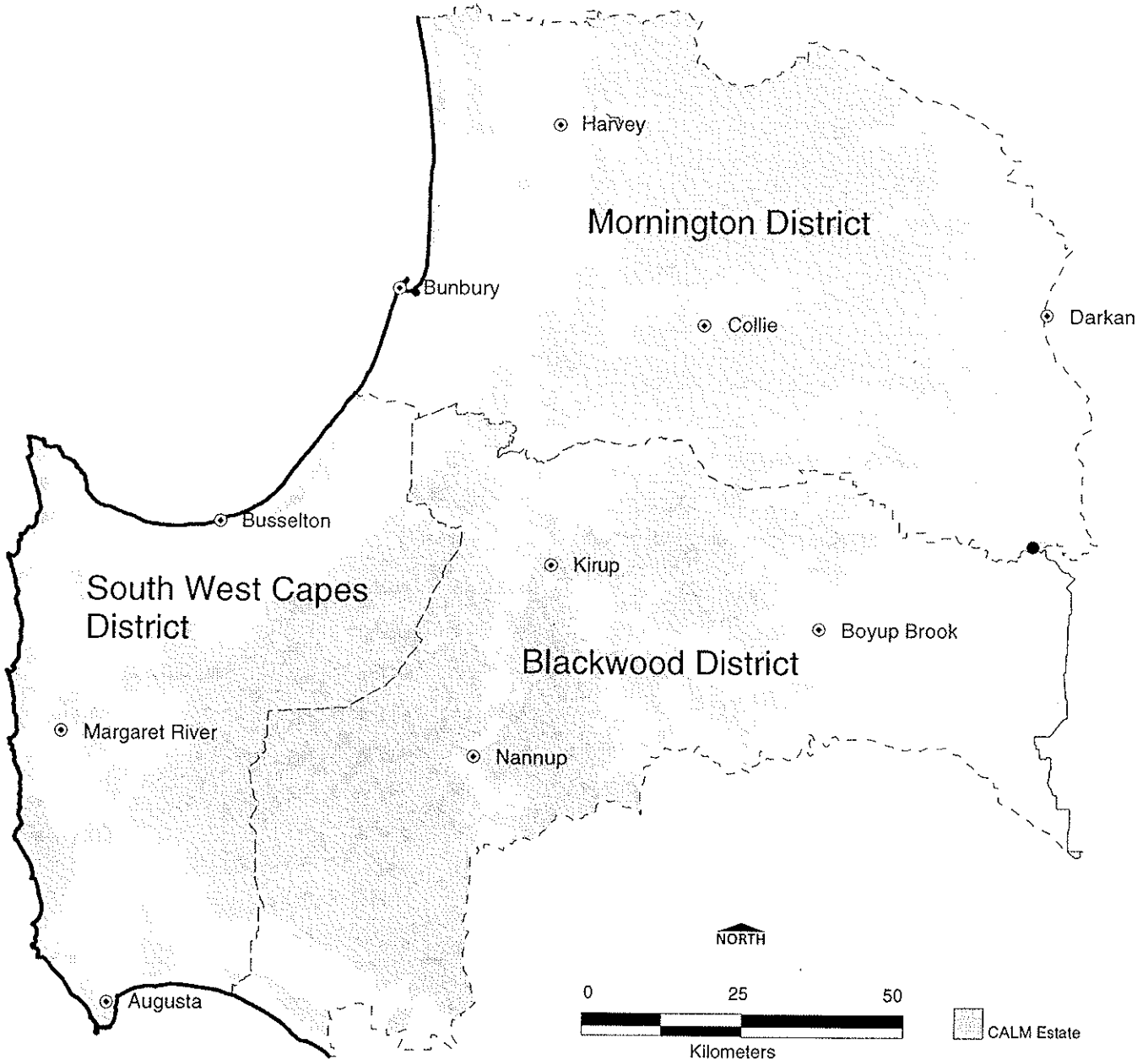
1. Effects of weeds on recruitment and establishment.
2. Pollination biology.
3. Seed germination requirements.
4. Longevity of plants, and time taken to reach maturity.
5. Habitat response to herbicide treatments.
6. Response of *Caladenia bryceana* subsp. *bryceana* ms and its habitat to fire.
7. Genetic variability within and between populations.



## References

- Hoffman, N. and Brown, A. (1998) *Orchids of South-west Australia*. Revised 2<sup>nd</sup> edition with supplement. University of Western Australia Press, Nedlands.
- Holland, E., Brown, A. and Kershaw, K. (1999) Dwarf Spider Orchid – *Caladenia bryceana* subsp. *bryceana* ms - Interim Recovery Plan No. 39, Department of Conservation and Land Management, unpublished report.

# Central Forest Region Threatened Flora Management Plan



- ***Caladenia bryceana* subsp. *bryceana* ms**

## *Caladenia busselliana* Hopper & A.P. Brown ms

## ORCHIDACEAE

### Bussell's Spider Orchid

*C. busselliana* ms is a pale coloured orchid that grows to 20 - 30 cm in height with 1 to 3 flowers 6 - 10 cm long and 1 - 3 cm wide. Its stiffly held petals and sepals range from pale to rich golden yellow. The lateral sepals are 5 - 5.5 cm long and 4 - 5 mm wide and splayed downwards, with long pale fawn, or rarely dark brown clubs 11 - 15 mm long. The petals also splay downward but are without clubs and measure 3 - 4.5 cm long and 3 - 4 mm wide. The labellum is pale yellow, or rarely cream, with faint to inconspicuous maroon radiating stipes near the base. The labellum is fringed at the base, usually by pale yellow segments with dark, clubbed tips.

It differs from other members of the *C. huegelii* complex in the stiffness of the petals and sepals. Its flowers resemble the rare Dunsborough Spider Orchid, *C. viridescens*, and the Swamp Spider Orchid, *Caladenia paludosa*, but are paler yellow, have broader labellum and longer (11 - 15 mm), narrower clubs on the sepals. It is one of only three clubbed king spider orchids in W.A. which lack a red apex to the labellum.

The flower was first collected from an unknown location for a flower show in 1954, but was only collected and recognised as a new species in 1990 by Greg Bussell.

**Flowering Period:** September to October

### Distribution and Habitat

It is apparently confined to two sites on the Leeuwin-Naturaliste Ridge between Dunsborough and Carbanup. Southern populations grow in winter-wet swamps and acidic grey sandy loam beneath *Corymbia calophylla* with *Anigozanthos viridis* and *Caladenia paludosa*. Near Carbanup, it was recorded with dense weedy herbs and *C. lorea*, *C. flava*, *C. latifolia* and *Diuris aff amplissima* in Tuart woodland with a Peppermint understorey and near Carbanup in an area of Marri regrowth with *Banksia*, *Melaleuca* and *Anigozanthos* species. Soils were calcareous grey sandy loam with scattered limestone rock near Quindalup and sandy loam over clay near Carbanup.

### Conservation Status

Declared Rare Flora – Critically Endangered

### Known Populations

| Population  | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Quindalup | SWC      | BSN   | VCL 36717   | 30.9.97     | 1             | poor      |
| 2 Carbanup  | SWC      | BSN   | Shire       | 7.10.97     | 2             | good      |

### Response to Disturbance

Flowers best after a summer fire. Responses to other disturbances not documented.

### Susceptibility to *Phytophthora* Dieback

Unknown, however there is no evidence that *Caladenia* species are susceptible.

### Management Requirements

1. Change status of VCL to Nature Reserve
2. Weed control
3. Habitat rehabilitation
4. Develop appropriate fire regime
5. Collaboration with the Botanic Garden and Parks Authority
6. Collection of propagation material
7. Population monitoring

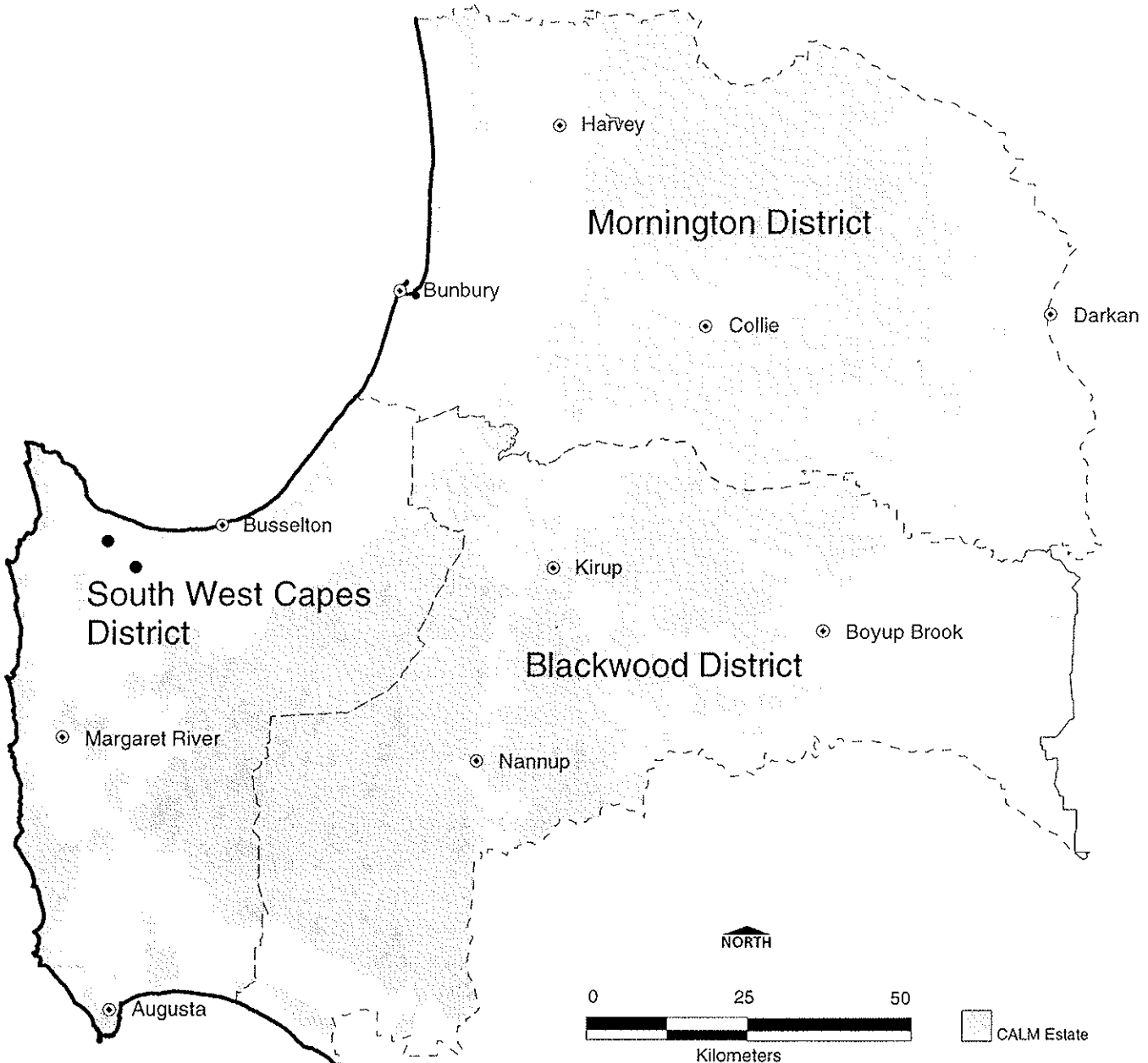
### Research Requirements

Current Interim Recovery Plan action items will be targeted.

## References

- Hoffman, N. and Brown, A. (1998) *Orchids of South-west Australia*. Revised 2<sup>nd</sup> edition with supplement. University of Western Australia Press, Nedlands.
- Papenfus, D. (1995) *Interim Wildlife Management Guidelines for 19 Critically Threatened Western Australian Taxa, Guideline 8: Caladenia busselliana* ms. Department of Conservation and Land Management, Western Australia.

# Central Forest Region Threatened Flora Management Plan



## ● *Caladenia busselliana* ms

*Caladenia caesarea* (Domin) M.A. Clem & Hopper subsp. *maritima* Hopper & A.P.

Brown ms

ORCHIDACEAE

*Caladenia caesarea* subsp. *maritima* ms is named after the Latin *maritimus* (growing by the sea) due to its coastal habitat. It is one of four subspecies of *C. caesarea*.

It grows to 15 - 20 cm and bears one to three flowers with stiffly held petals and sepals. The prominent yellow and brown striped labellum is thrust well forward before curving down and the margins of the labellum are down-curved. The lateral sepals are 2.3 - 6 cm long x 2 - 2.5 mm wide and petals 2.5 - 5 cm long. The labellum is 10 - 15 mm long and 6 - 9 mm wide. The flowers are only displayed for 3 - 10 days and are strongly scented. Pollination is solely dependent on the male thynnid wasp and successful pollination has been shown to be greatly influenced by the prevailing climatic conditions during the brief period of flowering.

*Caladenia caesarea* subsp. *maritima* differs from the other subspecies of *C. caesarea* in its smaller flowers with a protruding apex, its coastal granite habitat and its earlier flowering period.

**Flowering Period:** August to September

**Distribution and Habitat**

Limited to coastal granite areas near Cape Naturaliste over a geographic range of only 5 km. It usually grows amongst low heath and herbs in shallow soil pockets of reddish brown sandy-loam soils that collect in the crevices between rocks on coastal granite outcrops and bare rock. Occasionally it may be found under dense shrub thickets of *Calothamnus graniticus* in deeper soils away from the granite. The associated vegetation is usually open dwarf scrub over low heath, sometimes with scattered small trees.

**Conservation Status**

Declared Rare Flora - Endangered

Most of the land where *C. caesaria* subsp. *maritima* ms occurs is relatively undisturbed, however some recreation and camping facilities impact some populations. Populations 2 and 4 are subject to weed invasion, all other populations are in reasonable condition.

**Known Populations**

| Population             | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Castle Rock Bay East | SWC      | BSN   | Shire       | 12.8.97     | 0             | -         |
| 2 Castle Rock Bay West | SWC      | BSN   | Shire       | 12.8.97     | 6             | moderate  |
| 3 Point Picquet        | SWC      | BSN   | Shire       | 12.8.97     | 0             | -         |
| 4 Meelup Beach West    | SWC      | BSN   | Shire       | 14.8.97     | 5             | moderate  |
| 5a Meelup Rd West      | SWC      | BSN   | Shire       | 19.8.97     | 100+          | good      |
| 5b Meelup Rd Central   | SWC      | BSN   | Shire       | 19.8.97     | 100+          | good      |
| 5c Meelup Rd East      | SWC      | BSN   | Shire       | 19.8.97     | 12            | good      |
| 6 Rocky Point          | SWC      | BSN   | Shire       | 12.8.97     | 3             | good      |
| 7 Eagle Bay            | SWC      | BSN   | Shire       | 12.8.97     | 20+           | good      |

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown, however there is no evidence that *Caladenia* species are susceptible.

### **Management Requirements**

1. Continued liaison with Shire
2. Annual population monitoring
3. Propagation of material from tubers.

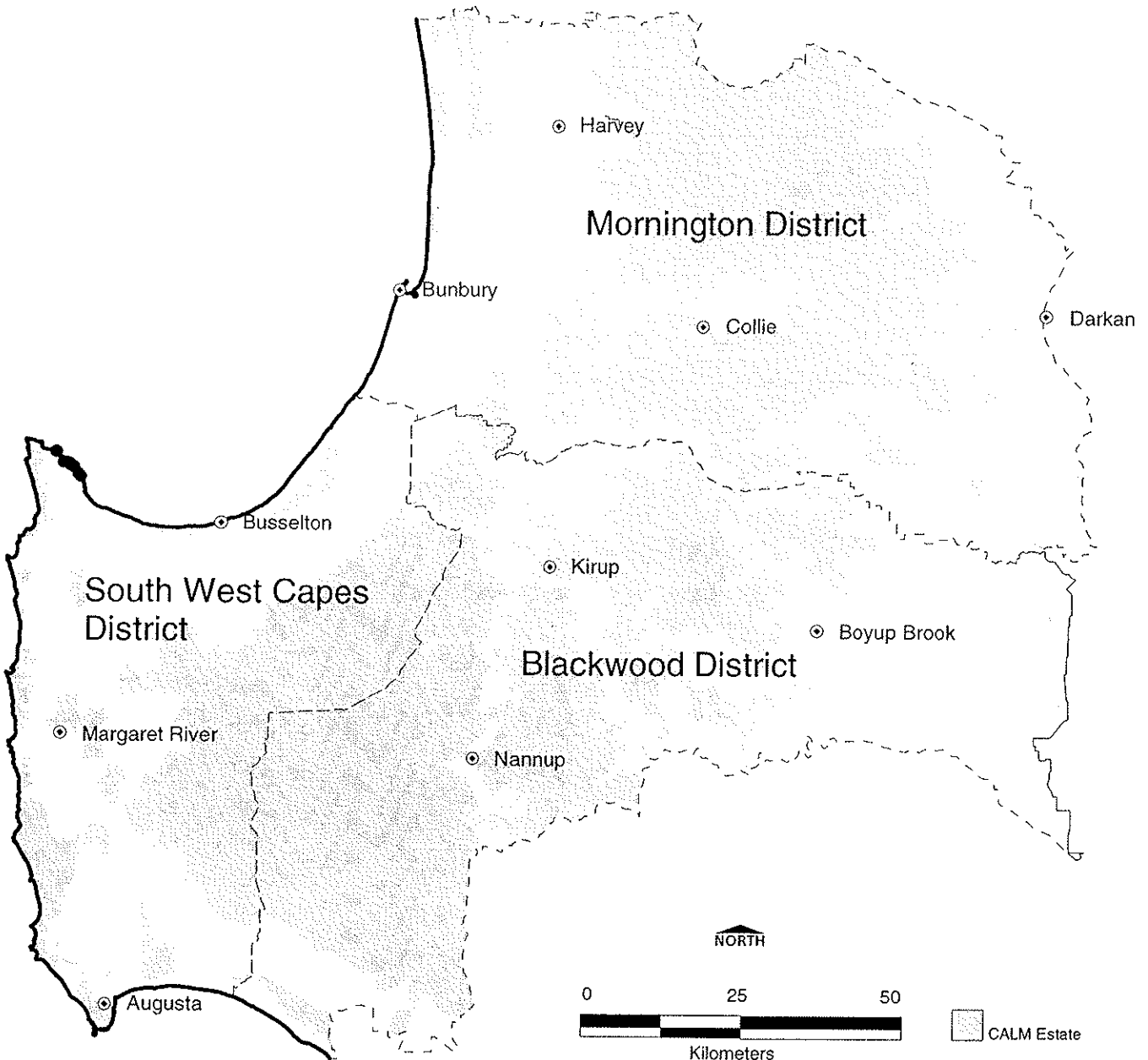
### **Research Requirements**

1. Encourage continued research by the BGPA into the fungal associations required for the successful establishment of orchid seedlings.

### **References**

Hoffman, N. and Brown, A. (1998) *Orchids of South-west Australia*. Revised 2<sup>nd</sup> edition with supplement. University of Western Australia Press, Nedlands.

# Central Forest Region Threatened Flora Management Plan



- ***Caladenia caesarea* subsp. *maritima* ms**



## *Caladenia christineae* Hopper & A.P. Brown ms

## ORCHIDACEAE

Christine's Spider Orchid

Tuberous, perennial herb, 0.2 – 0.4 m high. Perianth pale greenish-cream, sometimes tinged with pink; labellum white.

**Flowering Period:** August to October

### **Distribution and Habitat**

Occurs on clay-sandy-loam at edge of swamp in Melaleuca low woodland. It is distributed from Boyup Brook to Albany, predominantly in the Southern Forest Region.

### **Conservation Status**

Declared Rare Flora – Vulnerable

### **Known Populations**

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Kulikup  | BWD      | BOY   | -           | 3.11.77     | -             | -         |

### **Response to Disturbance**

Unknown

### **Susceptibility to *Phytophthora* Dieback**

Unknown, however there is no evidence that *Caladenia* species are susceptible.

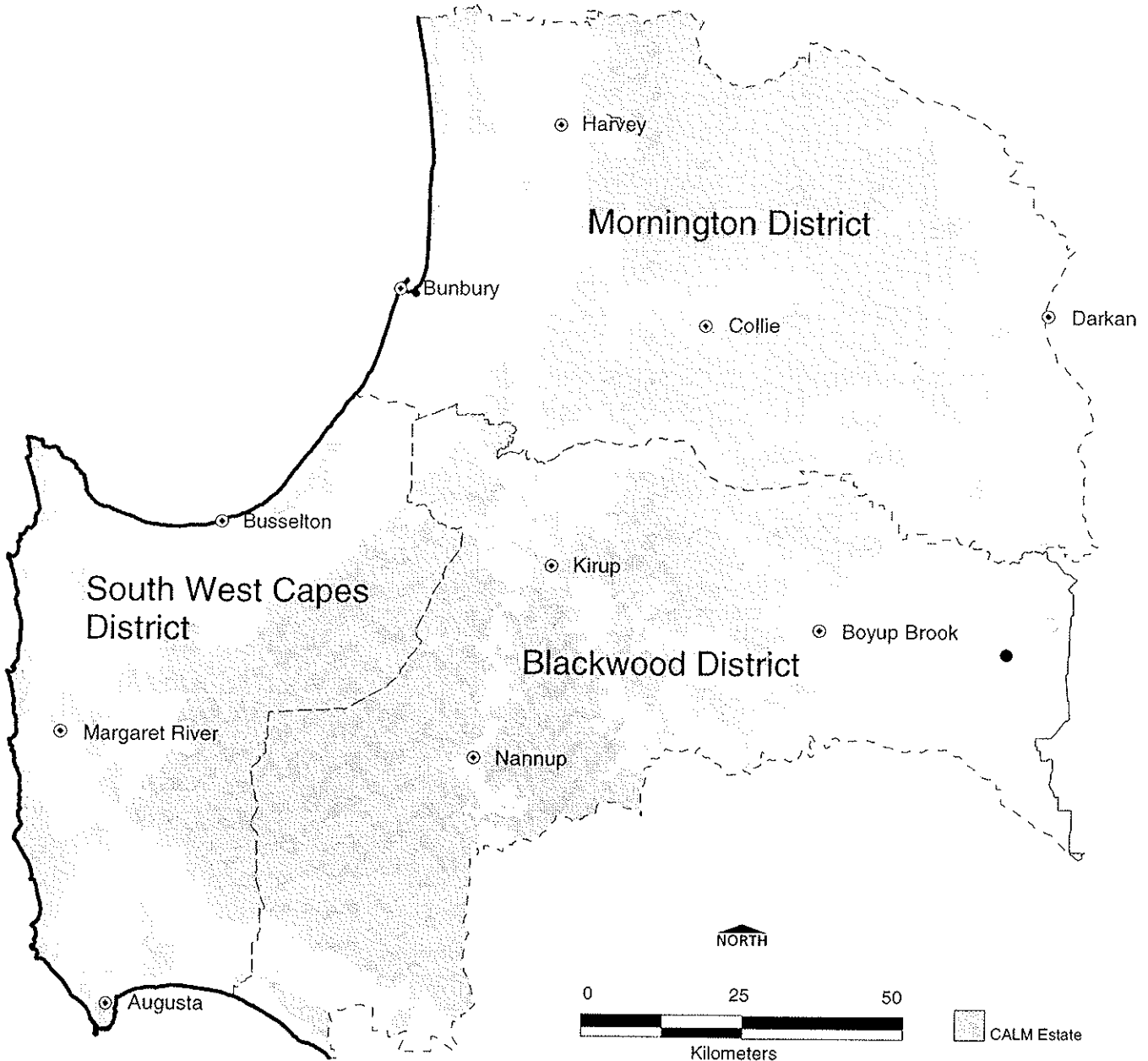
### **Management Requirements**

### **Research Requirements**

### **References**

Hoffman, N. and Brown, A. (1998) *Orchids of South-west Australia*. Revised 2<sup>nd</sup> edition with supplement. University of Western Australia Press, Nedlands.

# Central Forest Region Threatened Flora Management Plan



● *Caladenia christineae* ms

## *Caladenia dorrienii* Domin

## ORCHIDACEAE

### Cossack Spider Orchid

*Caladenia dorrienii* was described and named by Domin in 1912 after earlier collections from the Kojonup-Cranbrook area in the 1830's. It was reduced to a variety of *C. filamentosa* in 1971 but has since been recognised as a distinct species. The slender stem (up to 15 cm) is erect and hairy, with a narrow, linear leaf clasping the base and a short bract midway along its length. Narrow, linear sepals and petals are greenish white, with longitudinal red veins and darkly coloured, glandular, hairy tips. The erect dorsal sepal is 25 - 30 mm in length. The ovate labellum, on a short claw, has a few obtuse teeth along its margin and two rows (7 - 8 each) of closely set calli along the middle.

Usually growing in clusters or clumps, it can be distinguished from members of the *C. filamentosa* group by its shorter perianth segments, prominently down-curved petals and sepals and labellum with widely spaced marginal teeth and prominently irregular spots and blotches rather than distinct radiating lines.

**Flowering Period:** Late September to November

### Distribution and Habitat

Mainly found between Frankland and Kojonup, with a disjunct occurrence at West Dale. A single population is known from the Boyup Brook area. It grows under scattered *Eucalyptus wandoo* in sandy clay soil amongst low shrubs, annuals and dense low herbs.

### Conservation Status

Declared Rare Flora - Endangered

### Known Populations

| Population    | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Boyup Brook | BWD      | BOY   | Shire       | 15.10.96    | 68            | good      |

### Response to Disturbance

Above ground plant killed by fire, but regenerates from seed and tuber. Records for the Jarrahdale population indicate a cool Autumn burn of the area occurred in 1990, after the single plant known from the area hadn't been seen since 1987. More recent information on this population would provide additional insight into the species' fire response.

Response to soil disturbance - not known.

Susceptibility to weed invasion - not known.

### Susceptibility to *Phytophthora* Dieback

Unknown, however there is no evidence that *Caladenia* species are susceptible.

### Management Requirements

1. Monitor and control weeds as required.
2. Liaise with shire to minimise disturbance arising from recreational use of the reserve, provide advice to shire re: appropriate fire control regimes.

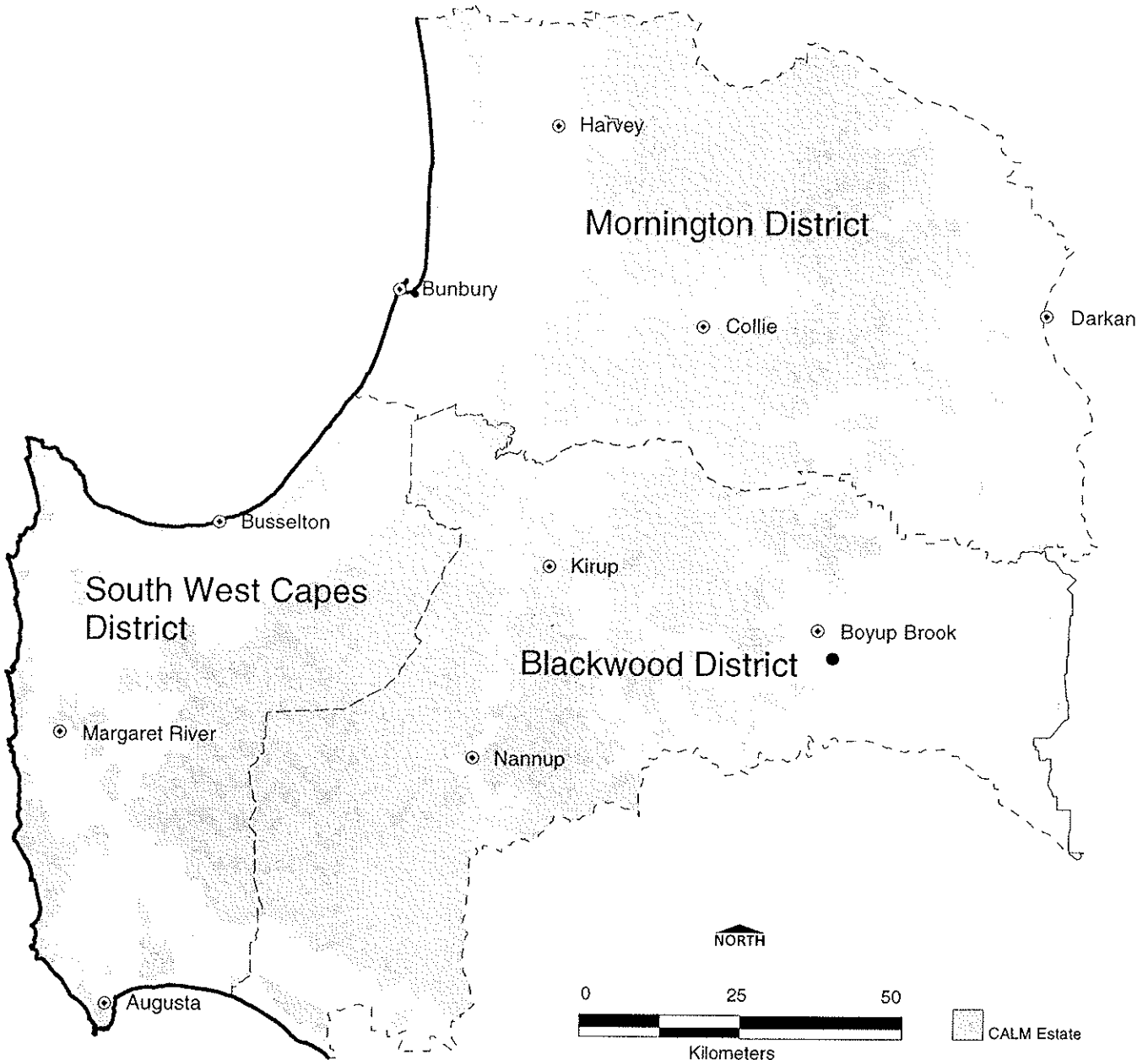
### Research Requirements

1. Encourage continued research by the BGPA into the fungal associations required for the successful establishment of orchid seedlings.

### References

Hoffman, N. and Brown, A. (1998) *Orchids of South-west Australia*. Revised 2<sup>nd</sup> edition with supplement. University of Western Australia Press, Nedlands.

# Central Forest Region Threatened Flora Management Plan



● **Caladenia dorrienii**

## *Caladenia excelsa* Hopper & A.P. Brown ms

## ORCHIDACEAE

### Giant Spider Orchid

*Caladenia excelsa* ms is the tallest Spider Orchid in Western Australia with scapes growing from 45 - 90 cm tall, usually with 1 to 2 flowers. Its inflorescences are 15 - 30 cm long x 7 - 15 cm wide, cream coloured and marked with maroon stripes. The leaves are 20 - 35 cm long and 6 - 12 mm wide. The dorsal sepal is erect initially but then arches backward and becomes pendulous. Petals (9.5 - 15 cm long x 3 - 5 mm wide) and lateral sepals (13 - 20 cm long x 5 - 7 mm wide) narrow at 2 - 2.5 cm to slender elongate pendulous filaments. The labellum (25 - 35 mm long x 12 - 17 mm wide), has cream coloured lamina at the base becoming maroon toward the apex and a marginal fringe 5 - 10 mm long.

*Caladenia excelsa* ms can be distinguished from the distantly related White Spider Orchid, *C. longicauda*, by its red-tipped labellum and long hanging petals and sepals.

**Flowering Period:** Late September to early November

### Distribution and Habitat

Distributed between Yallingup and Karridale along the Leeuwin-Naturaliste Ridge, *C. excelsa* ms can be found growing in deep sandy soils amongst dense, low shrubs in Banksia, Jarrah and Marri woodlands.

### Conservation Status

Declared Rare Flora - Endangered

### Known Populations

| Population           | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|----------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1a Caves Rd          | SWC      | AMR   | PP          | 10.10.97    | 9+            | good      |
| 1b Caves Rd          | SWC      | AMR   | Road        | 10.10.97    | 0             | poor      |
| 2a Caves Rd          | SWC      | BSN   | Road        | 16.10.97    | 0             | -         |
| 2b Caves Rd          | SWC      | BSN   | Road        | 16.10.97    | 7             | good      |
| 3 Caves Rd           | SWC      | AMR   | Shire       | 10.10.97    | 0             | poor      |
| 4a Caves Rd          | SWC      | AMR   | NP          | 27.10.97    | 0             | -         |
| 4b Caves Rd          | SWC      | AMR   | Road        | 27.10.97    | 5             | moderate  |
| 4c Loc 1059          | SWC      | AMR   | PP          | 20.11.96    | 2             | -         |
| 5 Caves Rd           | SWC      | AMR   | NP          | 10.10.97    | 0             | poor      |
| 6 Caves Rd           | SWC      | AMR   | NP          | 10.10.97    | 2             | moderate  |
| 7 Caves Rd           | SWC      | BSN   | NP, Road    | 9.10.97     | 0             | poor      |
| 8,10,11 Caves Rd     | SWC      | BSN   | NP, Road    | 9.10.97     | 5+            | good      |
| 9 R 9726             | SWC      | BSN   | Water       | 9.10.97     | 0             | good      |
| 12 Caves Rd          | SWC      | AMR   | PP          | 10.10.97    | 0             | poor      |
| 13 Caves Rd          | SWC      | AMR   | Road        | 20.10.84    | 5             | -         |
| 14 Location 1309     | SWC      | AMR   | PP          | 12.10.93    | 1             | -         |
| 15 Cowaramup Bay Rd  | SWC      | AMR   | Shire       | 27.10.97    | 0             | poor      |
| 17 Location 933      | SWC      | AMR   | PP          | 15.10.93    | 35            | -         |
| 19 Lot 8             | -        | -     | PP          | -           | -             | -         |
| 24 Catholic P School | SWC      | BSN   | Shire       | 8.10.97     | 1             | moderate  |
| 32 E of Yallingup    | SWC      | BSN   | -           | 9.10.67     | -             | -         |
| 33 Caves Rd          | SWC      | BSN   | -           | 10.90       | -             | -         |
| 44 Caves Rd          | SWC      | AMR   | Road        | 27.10.97    | 0             | good      |
| 44b Lot 7            | SWC      | AMR   | PP          | 10.10.97    | 3             | moderate  |
| 45 Loc 1305          | SWC      | BSN   | PP          | 8.10.97     | 3             | good      |
| 46 Loc 264           | SWC      | AMR   | PP          | 27.9.97     | 7+            | good      |
| 47 Loc 4212          | SWC      | BSN   | PP          | 14.10.97    | 3             | moderate  |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown, however there is no evidence that *Caladenia* species are susceptible.

### **Management Requirements**

1. Annual checks of all populations.
2. Burning will be required in some populations.
3. Liaison with developer required with regard to population on Loc 4212.

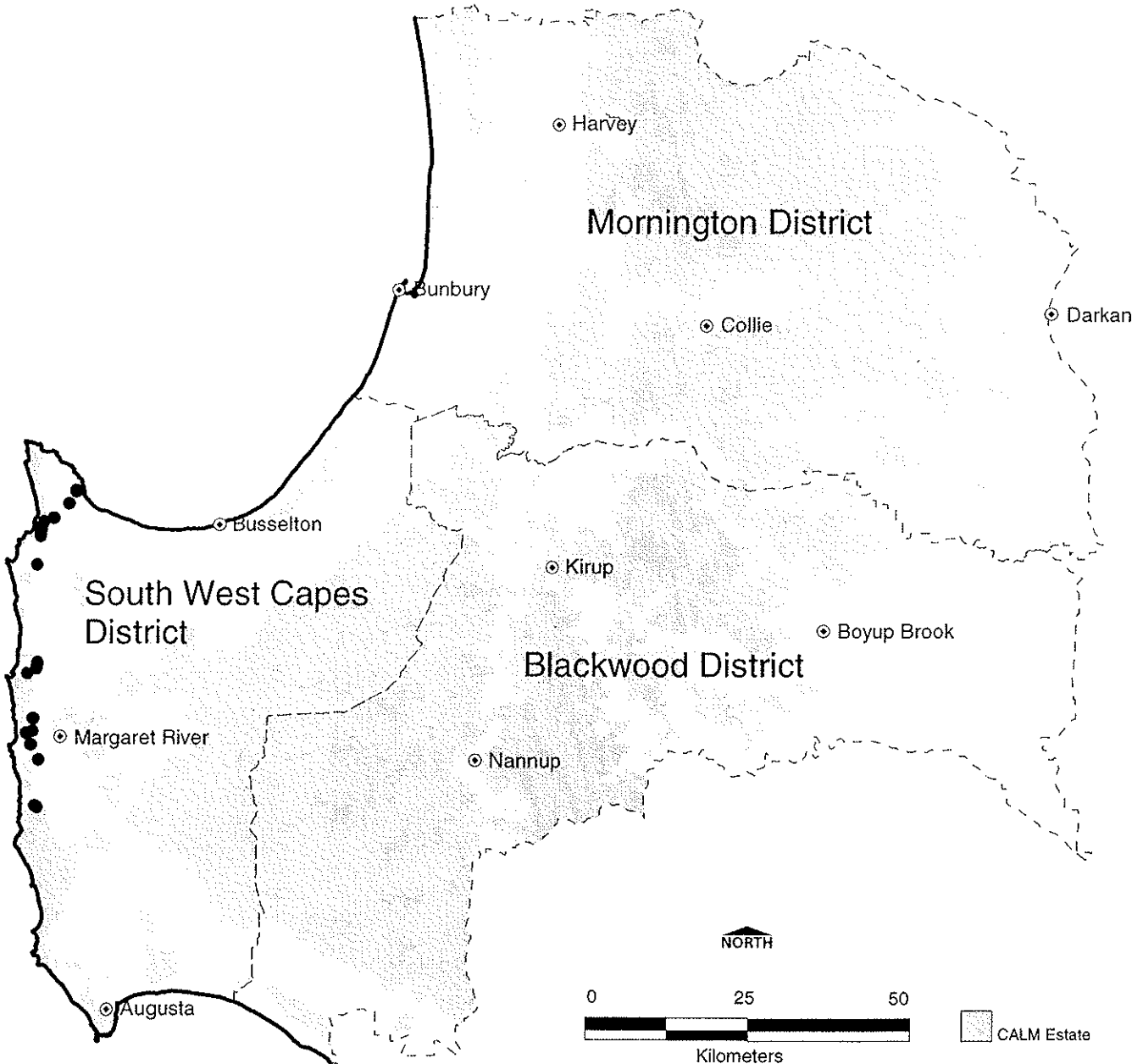
### **Research Requirements**

1. An optimal fire regime needs to be determined for this species.

### **References**

Hoffman, N. and Brown, A. (1998) *Orchids of South-west Australia*. Revised 2<sup>nd</sup> edition with supplement. University of Western Australia Press, Nedlands.

# Central Forest Region Threatened Flora Management Plan



● **Caladenia excelsa ms**

# *Caladenia harringtoniae* Hopper & A.P. Brown ms

ORCHIDACEAE

Pink Spider Orchid

*Caladenia harringtoniae* ms, one of smallest of the *C. longicauda* group, grows to ca. 30 cm tall, with small, sweetly fragrant pale pink flowers, 7 - 10 cm across and leaves, 15 - 25 cm. Petals and sepals are stiffly held near the base and have drooping apices. The dorsal sepal is 4.5 - 7 cm long x 2 - 3 mm wide, lateral sepals 5 - 8 cm x 4 - 7 mm and petals 3 - 4.5 cm x 3 - 4 mm. The labellum (13 - 18 mm long x 7 - 12 mm wide) is white near the base becoming deep pink towards the apex, with a short marginal fringe 2 - 5 mm long.

*Caladenia harringtoniae* ms can be distinguished from its nearest relative, *C. winfieldii*, by its slightly smaller, paler pink flowers, narrower tapering petals and sepals and smaller, shortly fringed labellum.

**Flowering Period:** September to November

### **Distribution and Habitat**

The species is known from a few populations, scattered widely between Nannup and Albany. The Pink Spider Orchid's preferred habitat is winter wet flats under open Banksia and paperbark. However the Mt Clarence population is in scrub in shallow loamy clay on a granite outcrop.

### **Conservation Status**

Declared Rare Flora - Vulnerable

### **Known Populations**

| Population                  | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Huitson Rd                | BWD      | BRG   | SF          | 11.10.96    | 16            | -         |
| 2 Bridgetown<br>Jarrah Park | BWD      | BRG   | SF          | 3.11.94     | 30            | -         |
| 3 Davidson Rd               | BWD      | NAN   | PP          | 18.10.90    | 43            | -         |

### **Response to Disturbance**

Plants killed by fire however, growth and flowering stimulated by summer fire.

### **Susceptibility to *Phytophthora* Dieback**

Unknown, however there is no evidence that *Caladenia* species are susceptible.

### **Management Requirements**

2. Monitor populations every 4 – 5 years, preferably after wet winters.
3. Avoid winter and spring burning of swamps.
4. Liaison with the Botanic Garden and Parks Authority regarding seed and mycelium collection and storage.

### **Research Requirements**

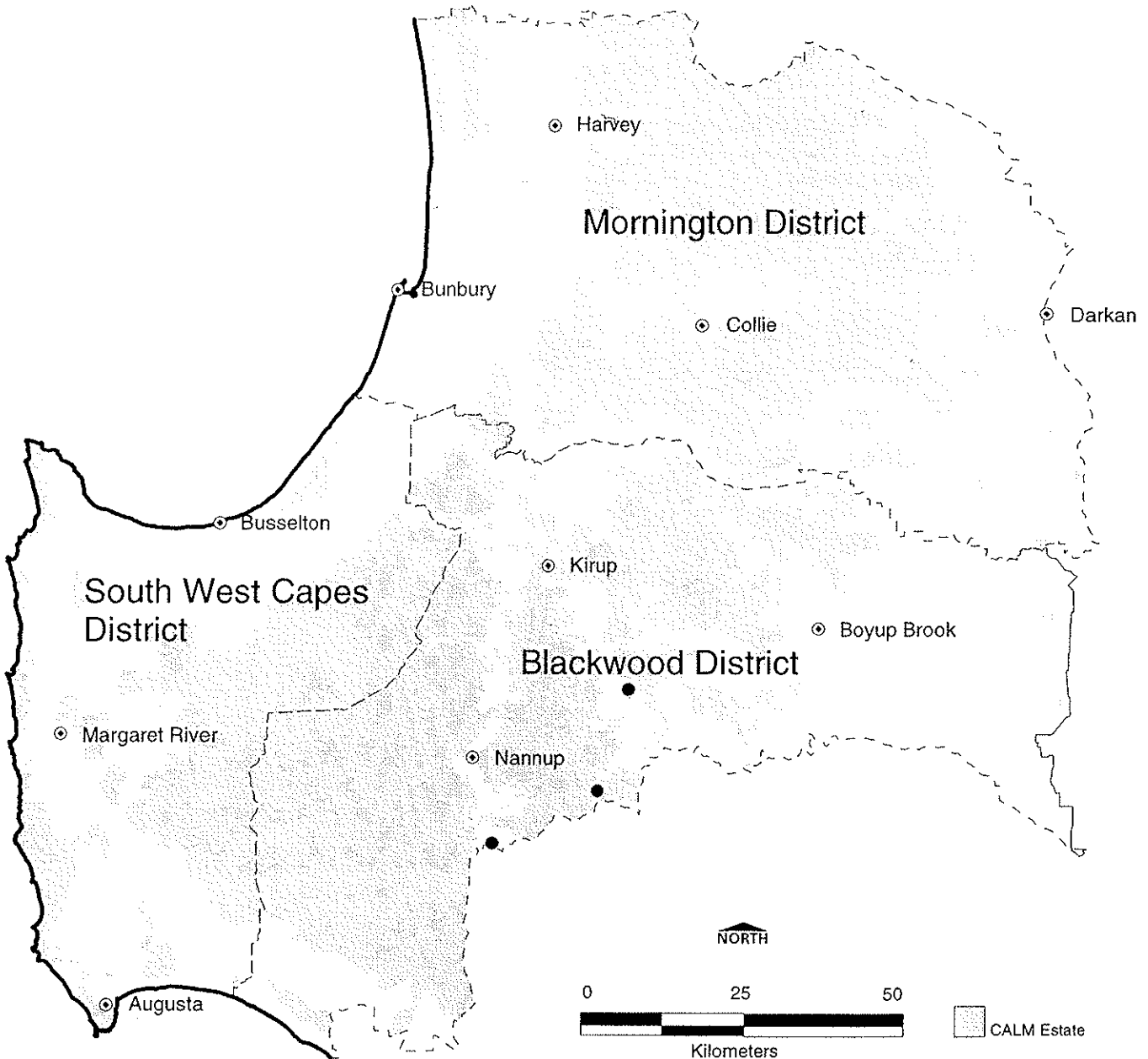
1. Assess *Phytophthora* susceptibility.

### **References**

Hoffman, N. and Brown, A. (1998) *Orchids of South-west Australia*. Revised 2<sup>nd</sup> edition with supplement. University of Western Australia Press, Nedlands.



# Central Forest Region Threatened Flora Management Plan



● *Caladenia harringtoniae* ms

## *Caladenia huegelii* Rchb.f.

## ORCHIDACEAE

### Grand Spider Orchid

*C. huegelii* is a slender orchid, usually growing to 30 - 70 cm high but occasionally up to 1 m. It has one or two striking flowers characterised by a greenish-cream labellum with a recurved, maroon tip and a long, often terminally branched fringe that extends well above the column. The sepals and petals are cream with red or pink suffusions. The sepals have enlarged, club-like swellings on their distal third. The hairy, linear leaf may be up to 40 cm long. The above ground portions of the plant die back to underground tubers over summer.

It differs from other members of the *C. huegelii* complex in its generally larger flowers with a comparatively large labellum and long fringe. For some time this name was misapplied to another species due to a mixed collection on the type collection sheet. The type collection was made by Baron von Huegel sometime prior to 1871, but contained specimens of three species, including *C. longiclavata*, the specimen which most closely fitted von Huegel's description and which has now become the type specimen, and another new species, *C. paludosa*.

**Flowering Period:** September to October

### Distribution and Habitat

It occurs over a range of over 300 km from Wanneroo to Northcliffe. The largest examples of this species occur in the Perth area. In the Central Forest Region it occurs on low sandy rises in low woodlands of *Banksia attenuata* and *Eucalyptus marginata*. It is probably more widespread, but requires intensive survey to locate the small populations.

### Conservation Status

Declared Rare Flora - Endangered

### Known Populations

| Population           | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|----------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Mt. Yates          | SWC      | AMR   | R 12974     | 21.9.83     |               |           |
| 3 Spring Creek       | BWD      | BRG   | -           | 03.10.86    | -             | -         |
| 5 R 9726             | SWC      | BSN   | Water       | 9.10.97     | 0             | good      |
| 6 Yallingup          | SWC      | BSN   | Shire       | 6.10.93     | 4-7           | -         |
| 7 Cowaramup Bay      | SWC      | AMR   | NR          | 12.10.93    | 5             |           |
| 8 Scott NP           | SWC      | AMR   | NP          |             | 20            | -         |
| 10 Yallingup Cave Rd | SWC      | BSN   | NP, Road    | 16.10.97    | 0             | moderate  |
| 14 SSE Yallingup     | SWC      | BSN   | R 8427A     | 6.10.93     | 0             | -         |
| 15 SE Eagle Bay      | SWC      | BSN   | Shire       | 19.8.97     | 0             | good      |
| 17 Lewana Pine Plant | BWD      | NAN   | SF          | 23.11.90    | 1             | -         |
| 21 Bunbury           | MON      | BUN   | -           | 28.9.85     | -             | -         |
| 22 Karridale         | SWC      | AMR   | -           | 12.10.77    | -             | -         |
| 23 N of Bunbury      | MON      | HVY   | -           | 21.10.62    | -             | -         |
| 24 Old Coast Rd.     | MON      | HVY   | ?Road       | 19.9.85     | >50           | -         |
| 33 Quininup Rd       | SWC      | BSN   | NP          | 9.10.97     | 0             | moderate  |
| 36 Willyabrup Rd     | SWC      | AMR   | Road        | 9.10.97     | 0             | poor      |
| 38 Ruabon            | SWC      | BSN   | NR          | 16.10.97    | 0             | poor      |
| 39 Cowaramup Rd      | SWC      | AMR   | Road        | 27.10.97    | 0             | poor      |
| 40, 26 Caves Rd N    | SWC      | BSN   | NP, Road    | 9.10.97     | 10            | good      |
| 40, 26 Caves Rd S    | SWC      | BSN   | NP, Road    | 9.10.97     | 6             | good      |
| 41 Cape Nat Drive    | SWC      | BSN   | Water       | 16.10.97    | 2             | good      |
| 42 Meelup Lookout    | SWC      | BSN   | Shire       | 20.10.97    | 2             | moderate  |

### Response to Disturbance

Favourable response to physical disturbance.

### **Susceptibility to *Phytophthora Dieback***

Unknown, however there is no evidence that *Caladenia* species are susceptible.

### **Management Requirements**

1. Roadside populations require annual monitoring and liaison with local authorities.
2. Population 36 is infested with grassy weeds.

### **Research Requirements**

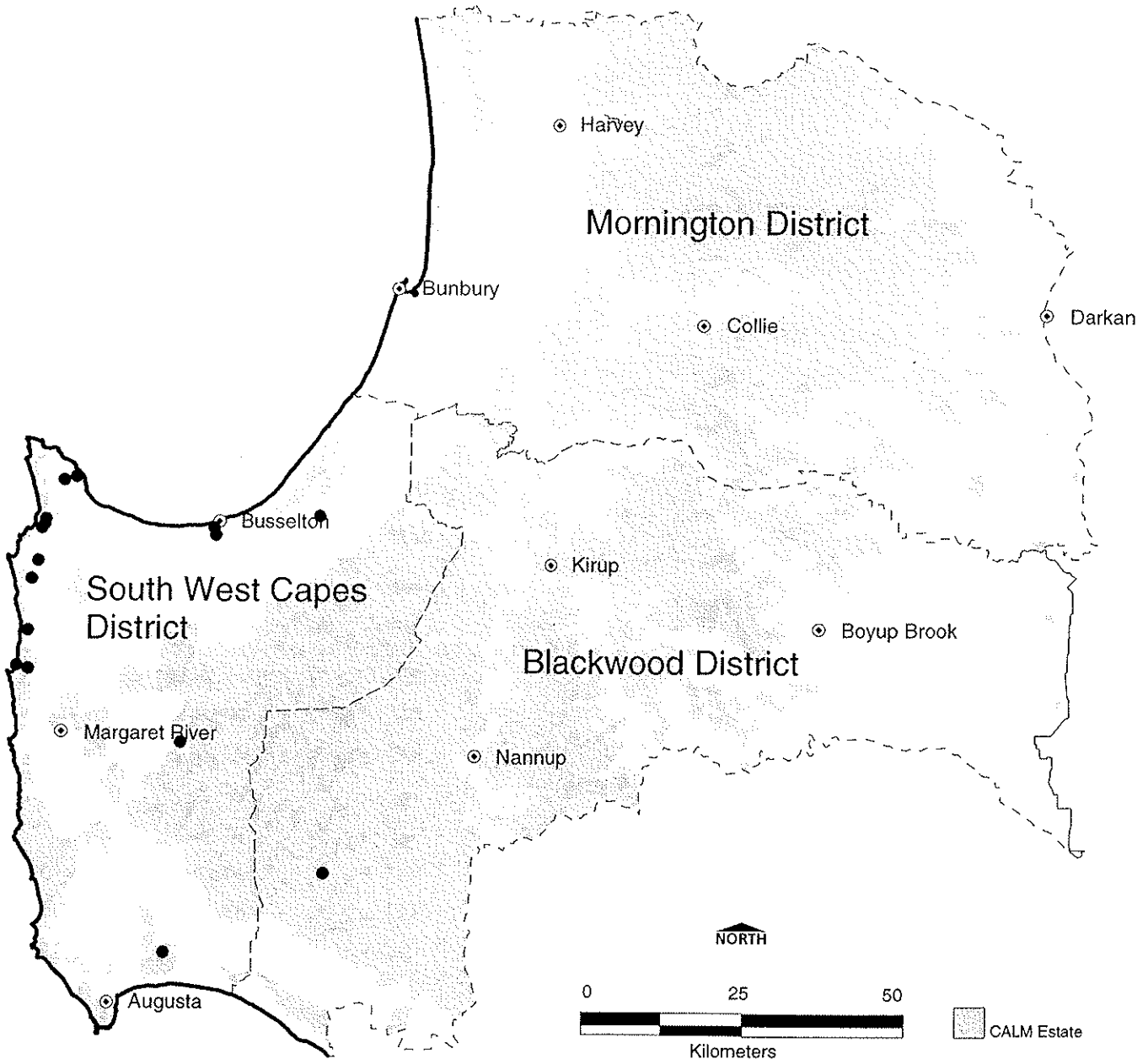
1. Conservation reserve populations require research on favourable fire regimes.

### **References**

Keighery, G. and Robinson, C. (1992) A Survey of Declared Rare Flora and Other Plants in Need of Special Protection of the Scott Plains. Unpublished Report to the Australian National Parks and Wildlife Service, Department of Conservation and Land Management, Western Australia.

Hoffman, N. and Brown, A. (1998) *Orchids of South-west Australia*. Revised 2<sup>nd</sup> edition with supplement. University of Western Australia Press, Nedlands.

# Central Forest Region Threatened Flora Management Plan



● *Caladenia huegelii*

## *Caladenia viridescens* Hopper & A.P. Brown ms

## ORCHIDACEAE

### Dunsborough Spider Orchid

A small, fine spider orchid, *Caladenia viridescens* ms differs from other members of the *C. huegelii* H.G. Reichb. complex in its stiffly held pale-green petals and sepals and narrow labellum (16 - 20 mm long x 9 - 14 mm wide). The labellum is fringed by dark maroon segments to 5 mm long with enlarged or tapering white-tipped apices. The lateral sepals, 4 - 5 cm long x 3.5 mm wide, have light golden brown clubs 7 - 13 mm long. Petals (3.4 - 3.8 cm long x 2.5 - 3 mm wide) lack clubs.

**Flowering Period:** September to October

### Distribution and Habitat

*C. viridescens* ms occurs in Marri and Peppermint woodlands in well drained, sand or lateritic loam soils.

### Conservation Status

Declared Rare Flora – Critically Endangered

The area around Busselton and Dunsborough, including the Leeuwin-Naturaliste National Park have been well surveyed by wildflower and orchid enthusiasts. Probably naturally restricted and particularly vulnerable to destruction from fire, weeds and road maintenance activities given its known locations. Vegetation clearance has significantly reduced suitable habitat and is probably the major factor contributing to its rarity.

### Known Populations

| Population                          | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-------------------------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Cape Nat Rd,<br>Meelup Rd turnoff | SWC      | BSN   | Road        | 16.9.97     | 6             | moderate  |
| 2 Bird Rock                         | SWC      | BSN   | Shire       | 30.9.97     | Nil           |           |
| 3 Catholic P. School                | SWC      | BSN   | Road        | 30.9.97     | 1             | poor      |
| 4 Quindalup Siding                  | SWC      | BSN   | Shire       | 30.9.97     | 2             | poor      |
| 5 Sugarloaf Rock Rd                 | SWC      | BSN   | NP          | 30.9.97     | 0             | moderate  |

### Response to Disturbance

Sugarloaf Rock population burned summer 94/95. No population recorded since. Inappropriate fire regimes during autumn, winter and spring can limit the regeneration potential by killing flowering plants and preventing seed set. Too frequent fires can exacerbate weed invasion. However some orchids respond to fire by germination and/or flowering, particularly following fires in summer when the plant is dormant.

Weed invasion is encroaching on many populations and appears to be a severe threat.

Soil compaction and establishment of tracks can also be negative factors. Orchids are particularly prone to picking.

### Susceptibility to *Phytophthora* Dieback

Unknown, however there is no evidence that *Caladenia* species are susceptible.

### Management Requirements

- Annual population monitoring.
- Liaison with busselton Shire regarding roadside management.
- Weed control and habitat reconstruction.
- Change status of VCL to Nature Reserve.
- Development of appropriate fire regime.
- Liaison with the Botanic Garden and Parks Authority and the WA Herbarium Threatened Flora Seed Centre regarding collection of propagation material.

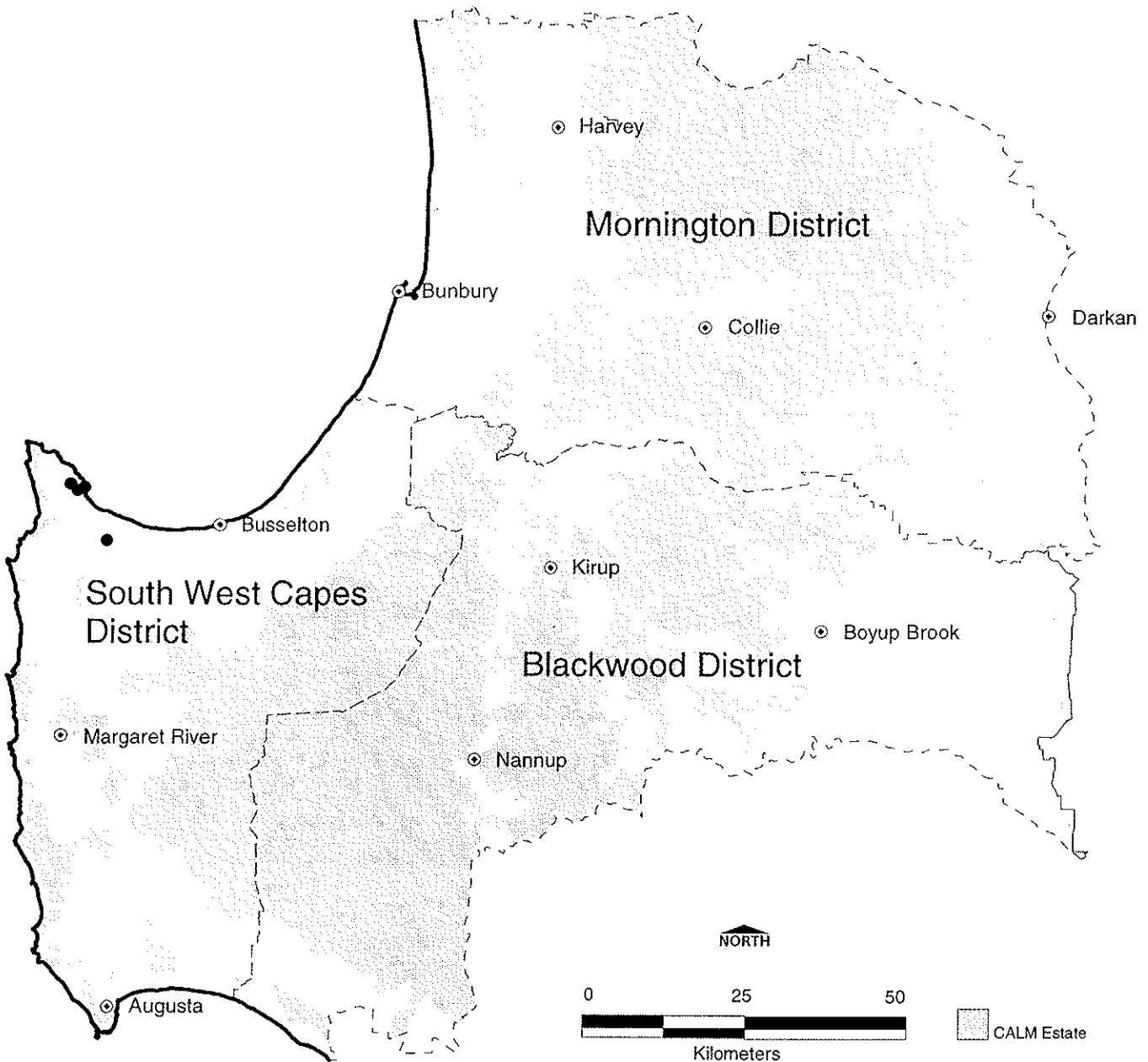
### Research Requirements

- Further research into the symbiotic relationship between fungi, endophytic bacteria and orchids is required.

## References

- Papenfus, D. (1995) *Interim Wildlife Management Guidelines for 19 Critically Threatened Western Australian Taxa, Guideline 9: Caladenia viridescens* ms. Department of Conservation and Land Management, Western Australia.
- Hoffman, N. and Brown, A. (1998) *Orchids of South-west Australia*. Revised 2<sup>nd</sup> edition with supplement. University of Western Australia Press, Nedlands.

# Central Forest Region Threatened Flora Management Plan



## ● *Caladenia viridescens* ms

## *Chamelaucium roycei* N.G. Marchant & Keighery ms

## MYRTACEAE

A loose, open, erect shrub to 1.5 m tall x 1 m wide. Young branches are either fawn or reddish, without prominent leaf bases. The leaves are arranged opposite with successive pairs at right angles to each other, on petioles approximately 0.2 mm long. The flowers are solitary in upper leaf axils and are shorter than leaves. Each flower has two caducous, brown bracteoles 1.5 - 2 mm long x 1.5 mm wide which fall off early in the flower's development. The green coloured floral tube is 2 mm wide and 3.5 - 4 mm long. Calyx lobes are narrowly ovate to triangular. The ten stamens have filaments which are slightly dilated at the base. The style is curved, 4 - 5 mm long with the apex surrounded by a ring of hairs.

**Flowering Period:** August to December.

### Distribution and Habitat

A number of populations, many in close proximity, are scattered between Capel, Busselton, Tutunup and Ambergate. Confined to winter wet sandy clay sites in low woodlands of *Eucalyptus rudis*, *Melaleuca raphiophylla*, *Astartea fascicularis*, or Proteaceous heaths

### Conservation Status

Declared Rare Flora - Vulnerable

### Known Populations

| Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1a Tutunup Rd      | SWC      | BSN   | Shire       | 15.12.95    | 10            | moderate  |
| 1b Tutunup Rd      | SWC      | BSN   | Water       | 15.12.95    | 16            | moderate  |
| 2a Tutunup Rd      | SWC      | BSN   | Shire       | 27.6.97     | 100's         | good      |
| 2b Tutunup Rd      | SWC      | BSN   | Rail        | 27.6.97     | 100's         | good      |
| 3a Tutunup Rd      | SWC      | BSN   | Shire       | 27.6.97     | 100's         | good      |
| 3b Tutunup Rd      | SWC      | BSN   | Rail        | 27.6.97     | 100's         | good      |
| 4a Tutunup Rd      | SWC      | BSN   | Shire       | 27.6.97     | 20            | moderate  |
| 4b Tutunup Rd      | SWC      | BSN   | Rail        | 27.6.97     | 50+           | moderate  |
| 5a Tutunup Rd      | SWC      | BSN   | Shire       | 27.6.97     | 20            | good      |
| 5b Tutunup Rd      | SWC      | BSN   | Rail        | 27.6.97     | 60+           | good      |
| 5c Loc 3203        | SWC      | BSN   | PP          | 2.1.98      | 15            | moderate  |
| 6 Lindberg Rd      | SWC      | BSN   | Shire       | 10.9.97     | 60+           | good      |
| 7 Lindberg Rd      | SWC      | BSN   | Shire       | 23.9.97     | 4             | poor      |
| 8 Lindberg Rd      | SWC      | BSN   | Shire       | 23.9.97     | 31            | good      |
| 9 Fish Rd          | SWC      | BSN   | Water, NR   | 27.12.95    | 15+           | good      |
| 10 Chapman Hill Rd | SWC      | BSN   | Shire       | 29.8.97     | 14            | poor      |
| 11 Princefield Rd  | SWC      | BSN   | Water       | 29.8.97     | 40+           | good      |
| 12 Kaloopup Rd     | SWC      | BSN   | PP          | 20.8.97     | 20            | poor      |

### Response to Disturbance

Seed germination possibly stimulated by fire.

### Susceptibility to *Phytophthora* Dieback

Dieback detected in Pop 1, RFRF Ray Smith 31.7.91, Pop 9 sampled for dieback 15.2.91 after extensive deterioration in condition.

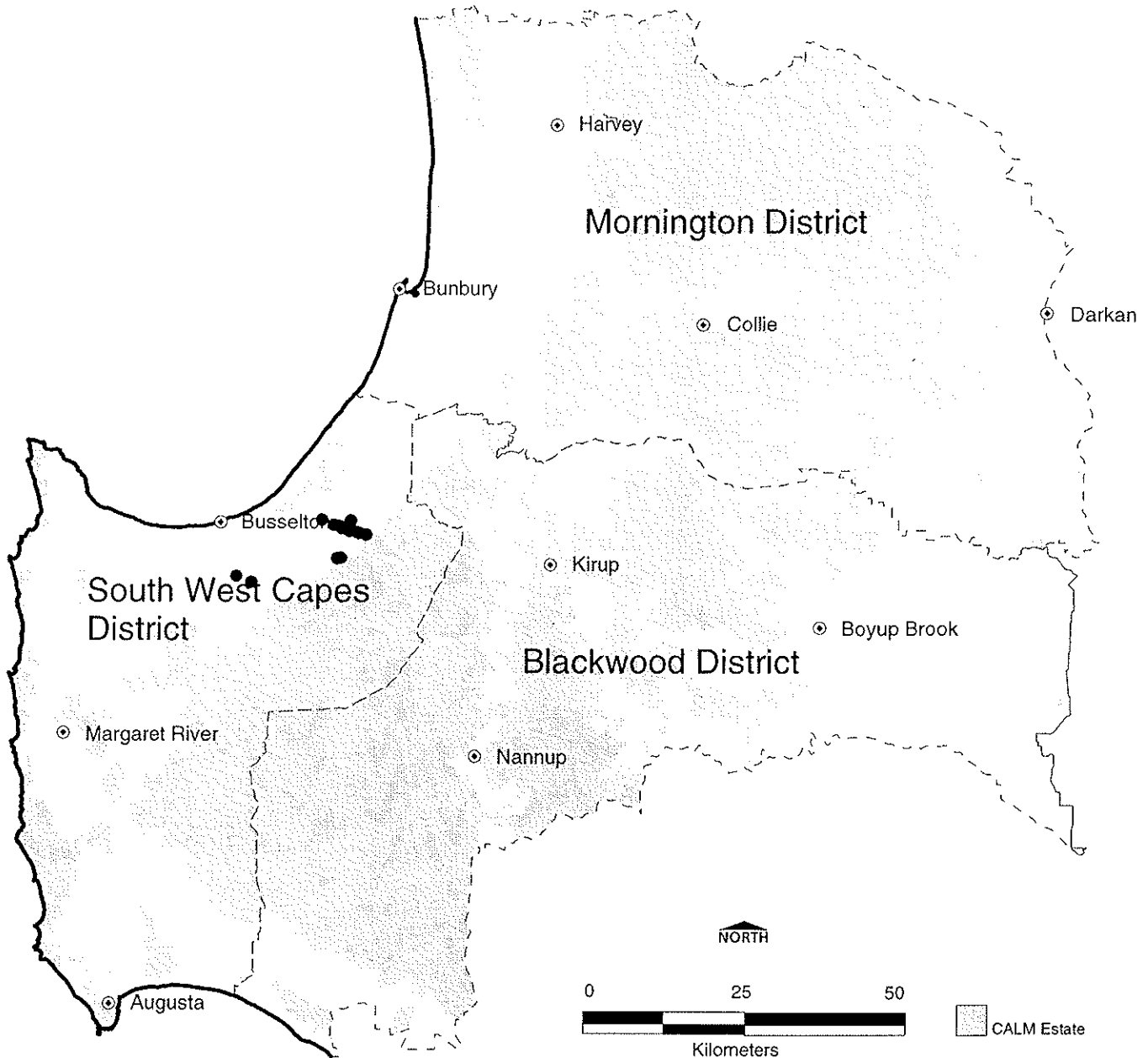
### Management Requirements

Cuttings for germination taken from Pop 3, 8, 28.6.91. No record of success (A. M. Fuss, RFRF)

### References:



# Central Forest Region Threatened Flora Management Plan



● *Chamelaucium roycei* ms

## *Darwinia ferricola* N.G. Marchant ms

## MYRTACEAE

*Darwinia ferricola* is a densely branched rounded shrub to 1 m x 1 m wide, although single-stemmed at the base. Young branches have prominent leaf bases. The leaves are scattered on the branches, spreading to recurved, linear, with entire margins, 5 - 9 mm long. Inflorescences are terminal, but not pendulous, surrounded by an involucre of narrow ovate, tapering, green bracts and contain 14 - 25 flowers. The flowers are green to greenish red, with a long, slightly curved style 12 - 15 mm long.

**Flowering Period:** October to December

### **Distribution and Habitat**

Presently known from a large outcrop of spongolite iron ore on the Scott River plains. The area is waterlogged in winter and occurs from Busselton to Augusta.

### **Conservation Status**

Declared Rare Flora - Endangered

### **Known Populations**

| Population            | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1a Governor Broome Rd | SWC      | AMR   | Shire       | 15.12.93    | 833           | -         |
| 1b Loc 4156           | SWC      | AMR   | pp          | 25.10.89    | 9325          | -         |
| 2a Loc 4263           | SWC      | AMR   | PP          | 12.3.90     | 29            | -         |
| 2b Loc 4264           | SWC      | AMR   | PP          | 6.10.89     | 1000          | -         |
| 2c Loc 4261           | SWC      | AMR   | PP          |             |               |           |
| 2d Loc 4262           | SWC      | AMR   | PP          | 13.10.97    | 100's         | good      |
| 3 Governor Broome Rd  | SWC      | AMR   | PP          | 8.2.95      | 6             | -         |

### **Response to Disturbance**

Killed by fire and soil disturbance.

Susceptibility to weed invasion is unknown.

### **Susceptibility to *Phytophthora* Dieback**

Affected by dieback

### **Management Requirements**

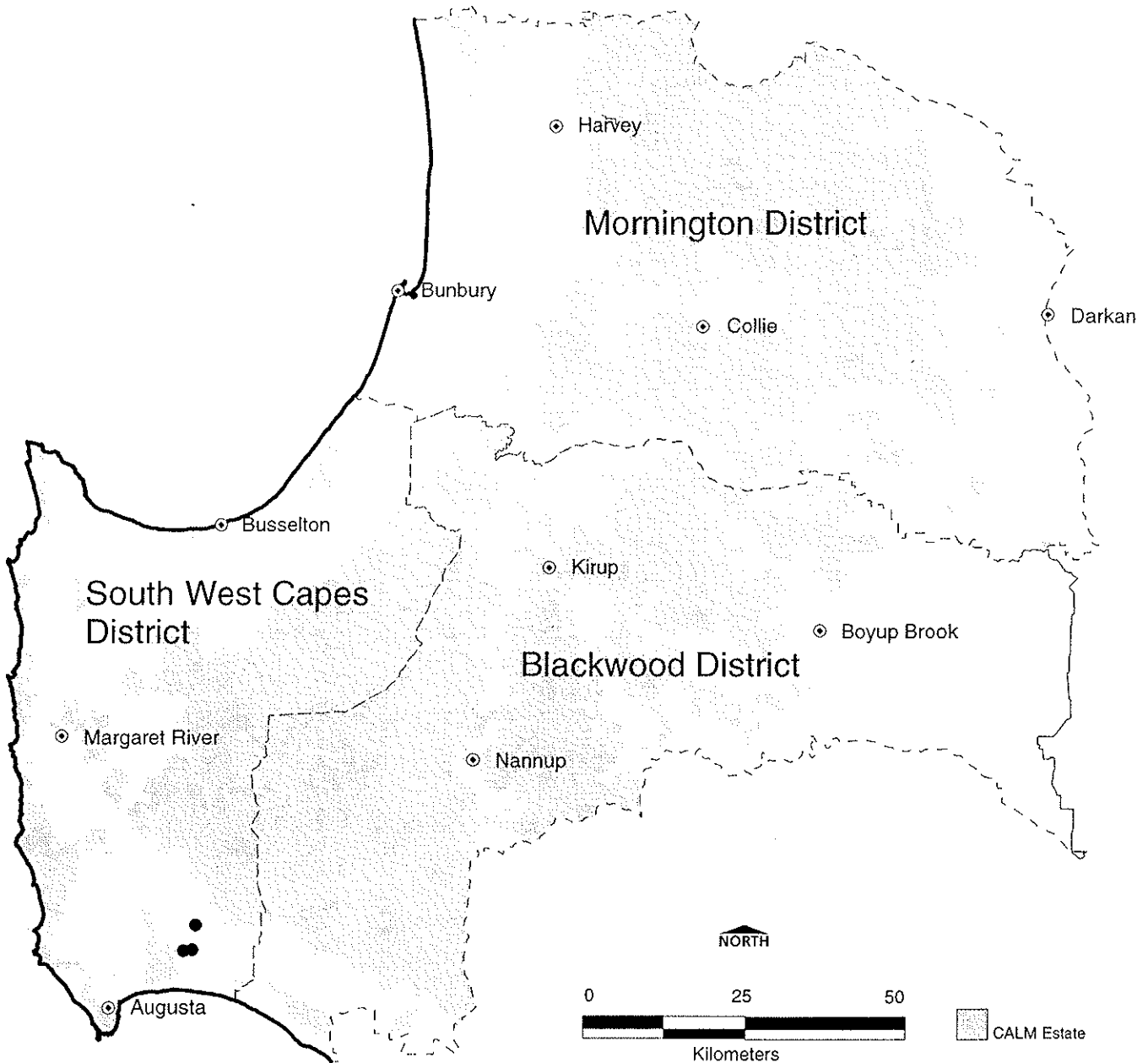
1. Define boundaries of Governor Broome Road populations.

### **Research Requirements**

Not defined

### **References**

# Central Forest Region Threatened Flora Management Plan



- *Darwinia ferricola ms*

## *Darwinia* sp. Williamson (G.J. Keighery 12717)

## MYRTACEAE

*Darwinia* sp. Williamson is a low mound-forming shrub to 50 cm high x 50 cm wide with the leaves clustered at the end of branches. The linear, sparsely haired leaves are recurved on the stem, 5 - 7 mm long and triquebrous in outline. Older branches retain the prominent leaf bases. Each inflorescence consists of 20 - 30 flowers, with long, tapering, pointed bracts with fringed margins surrounding the flowers.

*Darwinia* sp. Williamson appears to be closely related to *D. appiculata* but is distinguished by its recurved leaves, and fringed floral bracts which are red-green in colour rather than red-yellow. There are also fewer flowers in the inflorescence.

**Flowering Period:** October to December

### **Distribution and Habitat**

Known from only one location in the Whicher Range in shrubland over red clay over ironstone. A fire in 1992 resulted in the death of almost all mature plants, however the area was resurveyed in October 1994 and many seedlings were observed. Associated species were *Hakea varia*, *Loxocarya magna* and *Chamelaucium roycei*.

### **Conservation Status**

Declared Rare Flora – Critically Endangered

### **Known Populations**

| Population      | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Williamson Rd | SWC      | BSN   | SF          | 2.12.97     | 100+          | good      |

### **Response to Disturbance**

The species appears to be killed by fire with post-fire regeneration occurring mainly from seed. Response to other disturbances is unknown.

### **Susceptibility to *Phytophthora* Dieback**

The species is presumed to be dieback susceptible.

### **Management Requirements**

1. Close monitoring of recovery from fire.
2. Further survey work.

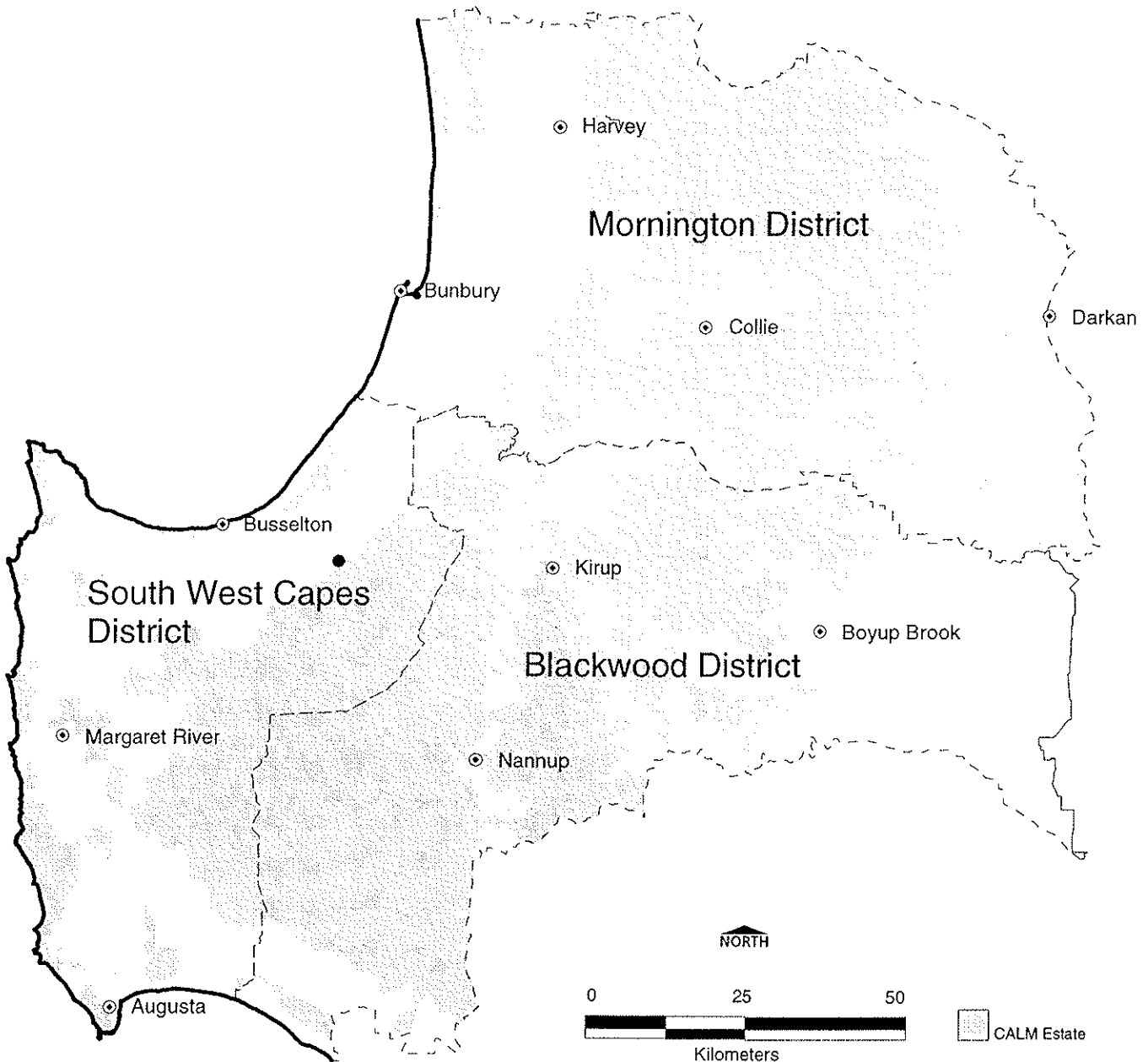
### **Research Requirements**

1. Study of the soil seed bank dynamics and the role of various factors including disturbance, competition, rainfall, grazing in recruitment and seedling survival.
2. Determination of reproductive strategies, phenology and seasonal growth.
3. Investigation of the mating system and pollination biology.
4. Investigation of population genetic structure, levels of genetic diversity and minimum viable population size.
5. Investigation of the impacts of dieback disease and control techniques on *Darwinia* sp. Williamson and its habitat.
6. The impact of changes in the level of salinity in the habitat.

### **References**

Stack, G., Evans, R. and English, V. (1999) Abba Bell – *Darwinia* sp. Williamson - Interim Recovery Plan No. 34, Department of Conservation and Land Management, unpublished report.

# Central Forest Region Threatened Flora Management Plan



- **Darwinia sp. Williamson (GJ Keighery 12717) [aff. apiculata]**

## *Daviesia elongata* Benth. subsp. *elongata*

## PAPILIONACEAE

*Daviesia elongata* subsp. *elongata* is low spreading glabrous shrub forming loose mounds of many tangled stems from a common rootstock. Leaves are linear, decurrent with narrow wings or ribs down the branchlet, with a prominent midrib and thickened margins. Racemes 2 - 3 flowered; Calyx including receptacle 5 – 7 mm long, upper two calyx-lobes united in a truncate emarginate lip. This species has linear-elliptic bracts that are 3 mm or longer in flower, and enlarge to 1 cm or more in fruit. Flowers orange and red in colour. Pods triangular, compressed, and acuminate.

**Flowering Period:** February

### **Distribution and Habitat**

This species occurs on grey sandy loam soils within the Whicher Range in low open forest to low forest. Associated species include *Banksia sphaerocarpa*, *Allocasuarina* sp, *Stirlingia latifolia*, *Adenanthos obovatus* and *Xanthorrhoea* sp.

Conservation Status

Declared Rare Flora - Vulnerable

### **Known Populations**

| Population      | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Carburnup     | SWC      | BSN   | Shire       | 18.11.96    | 100's         | good      |
| 2 Kemp Road     | SWC      | BSN   | SF          | 23.12.97    | 11            | moderate  |
| 3a Smith Road   | SWC      | BSN   | SF          | 13.1.97     | 600+          | good      |
| 3b Smith Road   | SWC      | BSN   | SF          | 11.9.97     | 200+          | good      |
| 3c Smith Road   | SWC      | BSN   | SF          | 26.8.97     | 3             | moderate  |
| 3d Smith Road   | SWC      | BSN   | SF          | 26.8.97     | 7             | good      |
| 4 Ambergate res | SWC      | BSN   | Shire       | 23.4.97     | 10            | moderate  |
| 5 Butler Block  | BWD      | Nan   | SF          | 16.4.98     | 1000's        | good      |

### **Response to Disturbance**

Responds favourably to infrequent burning.

### **Susceptibility to *Phytophthora* Dieback**

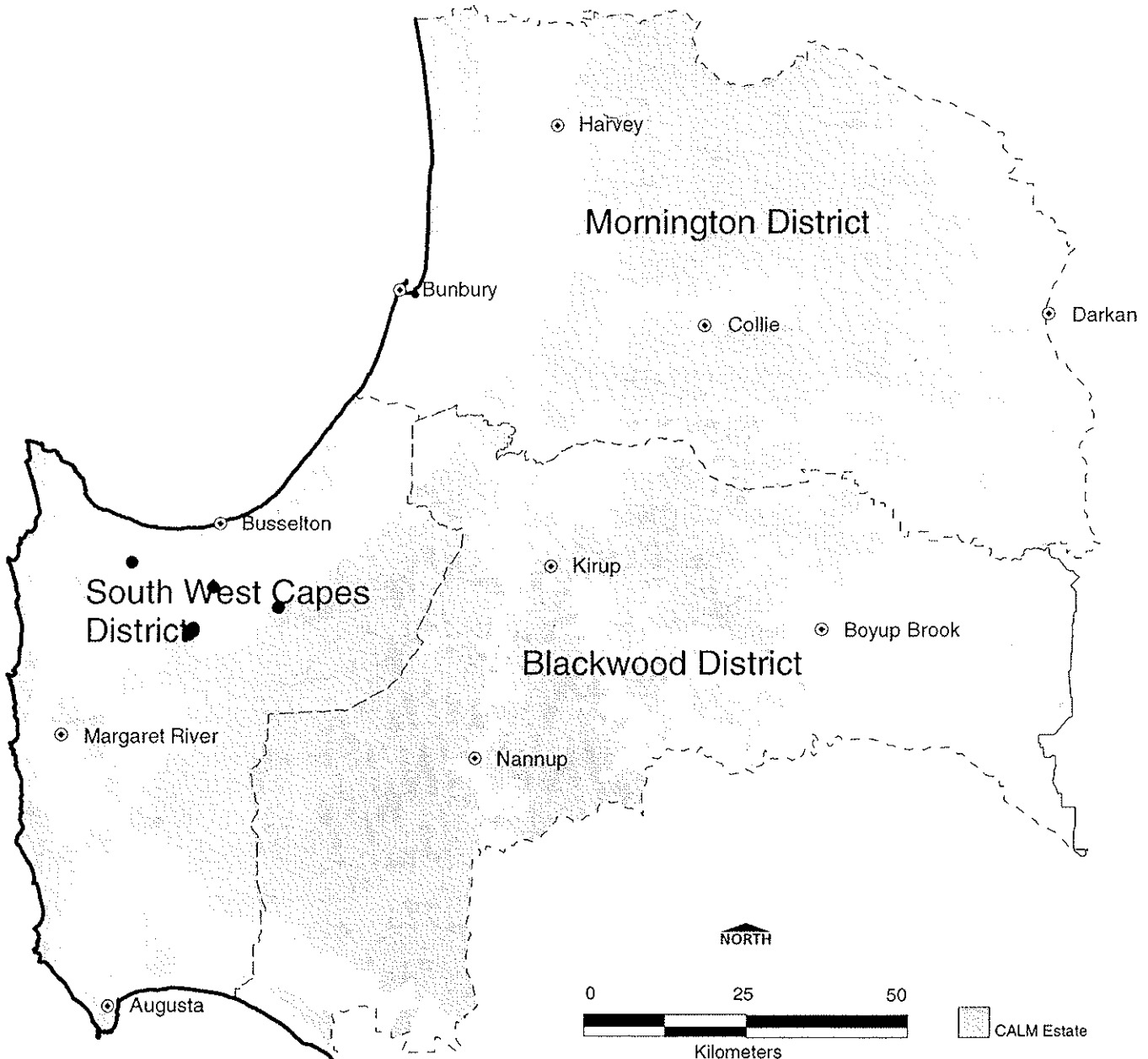
Susceptible

### **Management Requirements**

1. Further survey.
2. Disease hygiene measures implemented.

### **Research Requirements**

# Central Forest Region Threatened Flora Management Plan



## ● *Daviesia elongata* subsp. *elongata*

## *Diuris micrantha* D.L. Jones

## ORCHIDACEAE

### Dwarf Bee Orchid

A glabrous terrestrial herb with very slender inflorescences 30 - 60 cm in height. The linear, 4 - 6 leaves arise from the base of the plant and measure 8 - 13 mm x 1.5 - 2 mm. They are green, reddish at the base and somewhat fleshy. Sterile bracts are linear-lanceolate, acute to sub-acute and closely sheathing. Fertile bracts are lanceolate, acute and sheathing. The 1 - 6 flowers are approximately 14 mm long, yellow with red-brown markings. Petals are obliquely erect and divergent.

*Diuris micrantha* is closely related to *D. laxiflora* but is distinguished by much smaller, lighter coloured flowers and the proportionately shorter and broader labellum mid-lobe. It also has an earlier flowering period. It was first discovered in 1974 in a winter wet swamp in the Perth metropolitan area and was declared as rare flora in 1989, after a wildfire devastated the Perth population and recreational motorcycling destroyed a further proportion of the habitat.

**Flowering Period:** September to early October

### Distribution and Habitat

Known from four locations Collie, Yalgorup, Manjimup and Perth, it grows in swamps, drainage lines and seasonally inundated flats in clay soils. Associated vegetation at the two Central Forest Region sites consists of scattered *Melaleuca* spp. over dense low sedges, annuals and herbs (Collie) and scattered *Acacia saligna*, *Xanthorrhoea preissii* and *Hakea varia* over open herbs.

### Conservation Status

Declared Rare Flora - Vulnerable

### Known Populations

| Population           | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|----------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Collie             | MON      | WEA   | Road        | 10.8.95     | 21            | poor      |
| 2 Yalgorup Nat. Park | DWP      | HVY   | NP          | 13.10.93    | >20           | -         |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown

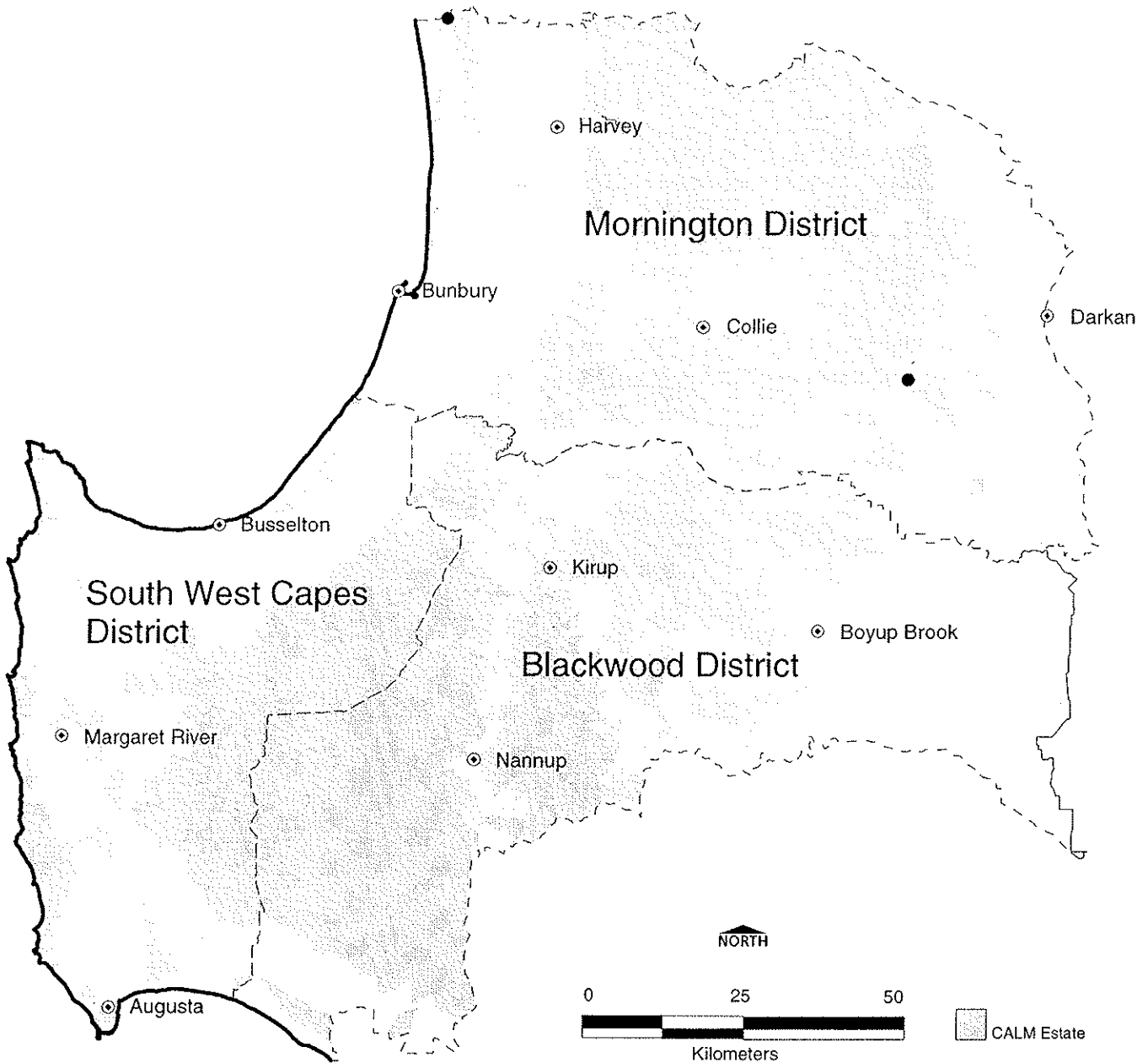
### Management Requirements

1. Monitor and control weeds where required.
3. Further survey to determine extent of populations
4. Maintain liaison with shire regarding road maintenance.

### Research Requirements



# Central Forest Region Threatened Flora Management Plan



● **Diuris micrantha**

## *Diuris purdiei* Diels

## ORCHIDACEAE

### Purdie's Donkey Orchid

*Diuris purdiei* is a slender orchid with 5 - 10 narrow, spirally twisted leaves arising from the base and enclosed in two prominent sheaths. It has up to 10 distinctive flowers on a single spike to 45 cm high. The flowers are pale yellow with magenta-brown markings at the base of the labellum and on the underside of the petals. The conspicuous labellum has a broad, ridged middle lobe and smaller, fringed lateral lobes. It partially conceals the long, narrow, lateral sepals which are greenish in colour. Spreading petals are elliptical on long claws. The small dorsal sepal stands erect. The fruit is a small, urn-shaped capsule with many fine seeds.

Although it is superficially similar to the Nanny Goat Orchid, *D. laevis*, *D. purdiei* is distinguished by the unusual flattened flowers and the prominent magenta-brown marking. Additional features are the smaller dorsal sepal and smaller, fringed lateral lobes of the labellum.

*D. purdiei* is believed to be pollinated by small beetles and native bees. Non-flowering plants in unburnt habitats consist of a single narrow leaf. The above-ground portion of the plant dies back to cylindrical tubers over summer.

Named by Diels in 1903, on honour of Western Australian collector Alexander Purdie who first collected it near Cannington in 1901.

**Flowering Period:** Only after a summer or early autumn fire from late September to mid-October.

### Distribution and Habitat

*D. purdiei* has been observed at a number of localities in the southern metropolitan area. It has also been located near Harvey and in the proposed Whicher Range Nature Reserve. *D. purdiei* grows in scattered shrub areas which are subject to winter inundation. The soil type is sand to sandy clay. The vegetation type is an open low shrubland, with occasional *Melaleuca preissiana*. The understorey is usually *Leptospermum ellipticum* with scattered *Xanthorrhoea preissi*.

### Conservation Status

Declared Rare Flora - Endangered

### Known Populations

| Population            | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Whicher Range       | SWC      | BSN   | SF          | 10.10.76    | -             | -         |
| 2 Wellington Loc 3070 | MON      | HVY   | PP          | 12.8.86     | -             | -         |

### Response to Disturbance

Known to be dependent on summer fire to propagate.

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

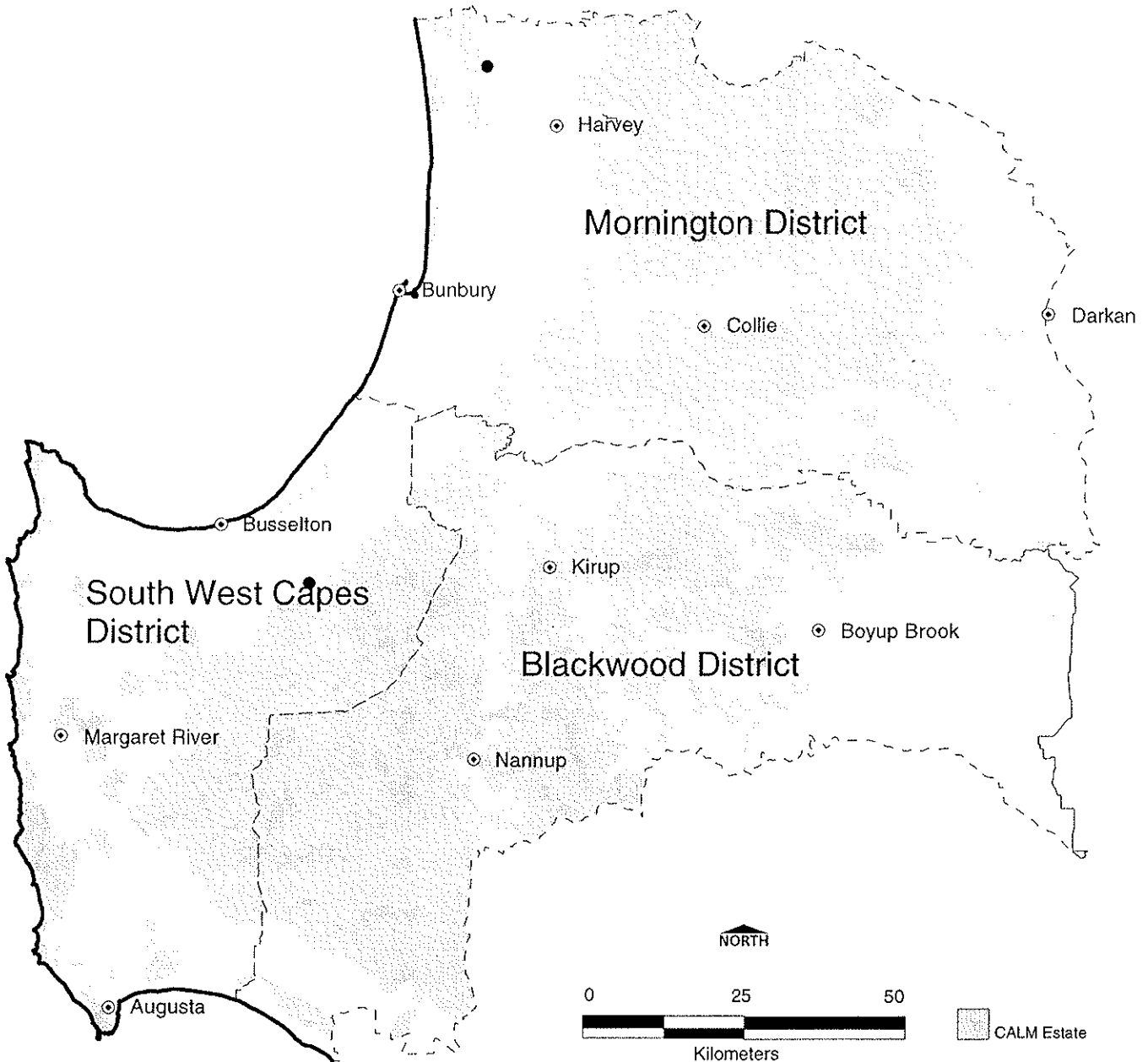
1. Further survey

### Research Requirements

### References

- Maddocks T.I. and Lamont B.B. (1984) The ecology, conservation status and propagation of two gazetted rare orchids *Caladenia gemmata* forma *lutea* and *Diuris purdiei*. A Report for the Department of Fisheries and Wildlife.
- Hoffman, N. and Brown, A. (1998) *Orchids of South-west Australia*. Revised 2<sup>nd</sup> edition with supplement. University of Western Australia Press, Nedlands.

# Central Forest Region Threatened Flora Management Plan



● *Diuris purdiei*

## *Drakaea confluens* Hopper & A.P. Brown ms

## ORCHIDACEAE

### Late Hammer Orchid

This orchid grows to a height of 15 - 30 cm and bears a single flower 3 - 5 mm broad and 2 - 4 cm long. It has a uniformly green leaf which is often covered in short dense hairs. The labellum is bi-coloured with a straight apex and conspicuous spots.

*D. confluens* ms has a similar labellum and leaf to *D. isolata*, but differs in its larger flowers and bi-coloured labellum. It also resembles *D. livida*, but is distinguished by the scabrid, minutely hairy leaf and by the straight or slightly upturned tail of the labellum lamina.

**Flowering Period:** October to November

### Distribution and Habitat

Restricted to three disjunct areas; near Boyup Brook, in the Stirling Range and near Pingrup. Boyup Brook populations grow in sandy sites associated with *Kunzea ericifolia*, jarrah and *Banksia attenuata* woodland. In the Stirling Range jarrah and *B. attenuata* are also dominant, but the understorey comprises low scrub containing *Dasypogon* and *Stirlingia* species. Near Pingrup, the species grows on gypsum dunes in open mallee heath adjacent to salt flats.

### Conservation Status

Declared Rare Flora – Critically Endangered

Extensive searching has failed to discover any populations between the known locations.

### Known Populations

| Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1a Well'n Loc 3756 | MON      | WEA   | PP          | 17.11.99    | 81            | good      |
| 1b Well'n Loc 3756 | MON      | WEA   | PP          | 17.11.99    | 41            | good      |
| 2 Haddleton        | MON      | WEA   | NR          | 14.10.99    | 4             | good      |
| 3a Muja CP         | MON      | WEA   | VCL         | 17.11.99    | 0             | disturbed |
| 3b Muja CP         | MON      | WEA   | VCL         | 17.11.99    | 53            | good      |
| 3c Muja CP         | MON      | WEA   | VCL         | 17.11.99    | 2             | good      |

### Response to Disturbance

The response of *Drakaea confluens* ms to summer fire (December-early May) is unknown. It is likely that the orchid would be killed by fire during its active growing period (late May-early November). Continued disturbance, such as annual grading of firebreaks, is known to kill plants of *Drakaea* species (pers. comm., A. Brown).

### Susceptibility to *Phytophthora* Dieback

Although it is unlikely that *Drakaea confluens* ms is susceptible to dieback, the habitat is highly susceptible and therefore impacts directly on the species.

### Management Requirements

1. Further survey.
2. Monitor and control weeds where required.
3. Continue liaison with land owners.

### Research Requirements

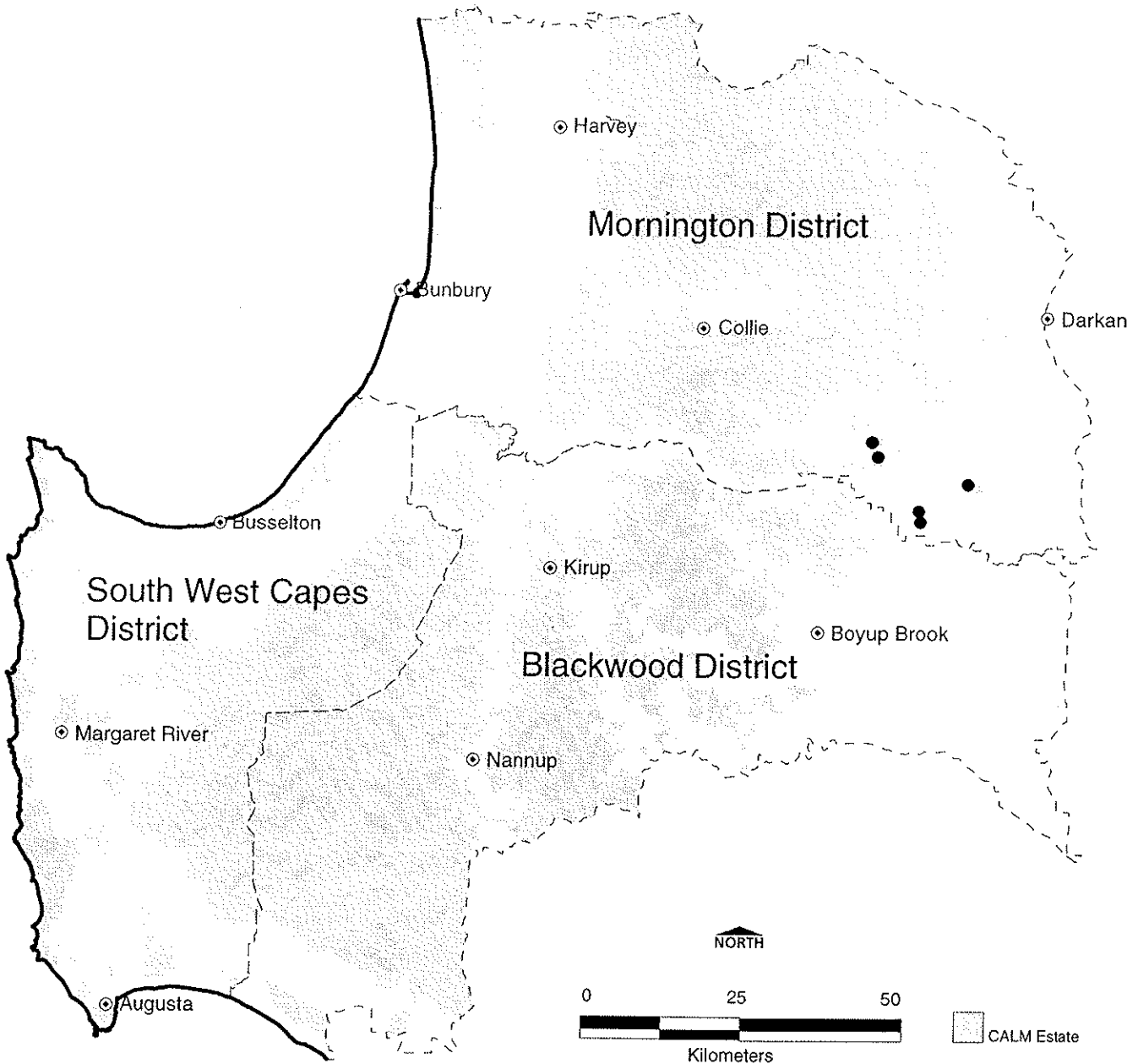
1. Study of the soil seed bank dynamics and the role of various factors including disturbance (eg fire), competition, and rainfall, grazing in recruitment and seedling survival.
2. Determination of reproductive strategies, phenology and seasonal growth.
3. Investigation of the mating system and pollination biology.
4. Investigation of population genetic structure, levels of genetic diversity and minimum viable population size.
5. Investigation of the impacts of dieback disease and control techniques on *Drakaea confluens* ms and its habitat.

**References**

Hoffman, N. and Brown, A. (1998) *Orchids of South-west Australia*. Revised 2<sup>nd</sup> edition with supplement. University of Western Australia Press, Nedlands.

Phillimore, R. and Brown, A. (2000) Late Hammer Orchid – *Drakaea confluens* ms – Interim Recovery Plan (draft), Department of Conservation and Land Management.

# Central Forest Region Threatened Flora Management Plan



● ***Drakaea confluens* ms**

## *Drakaea elastica* Lindl.

## ORCHIDACEAE

### Glossy-leaved Hammer Orchid

This species was described by Lindley in 1840. However, the name became misapplied to the more common *D. livida*. It was redescribed as *D. jeanensis* by Rogers in 1920 and recognised under this name until the late 1980's, when closer inspection of the type collection and description revealed the error.

*Drakaea elastica* is a slender orchid with a distinctive bright green, glossy leaf that is orbicular to cordate in shape and up to 2 cm in diameter. Its highly modified flower is solitary on an erect stem up to 30 cm high. The hinged labellum has a swollen 'hammer-like' end that is constricted into two lobes. The larger lower lobe is glabrous while the short upper lobe is densely covered with purple glands and hairs. The perianth segments are narrowly linear and yellowish-green in colour. The leaf is usually withered by the time of flowering and stems die back to an underground tuber over summer. *D. elastica* is most easily located in July to August when the leaves are conspicuous.

**Flowering Period:** October to early November

### Distribution and Habitat

Distributed between Cataby and Ruabon on the Swan Coastal Plain. Occurs in deep sandy soil in *Banksia* woodland and is often associated with *Kunzea ericifolia*. Four populations are known from the metropolitan area, however one is possibly extinct.

### Conservation Status

Declared Rare Flora - Endangered

### Known Populations

| Population             | District | Shire | Land Status   | Last Survey | No. of Plants | Condition |
|------------------------|----------|-------|---------------|-------------|---------------|-----------|
| 1 Yarloop              | MON      | HVY   | Shire/Road    | Summer97    | 0             | Burn Ap97 |
| 2 Capel                | SWC      | CAP   | Utility       | 26.10.93    | 20            | -         |
| 3 Ruabon               | SWC      | BSN   | NR            | 19.9.97     | 0             | poor      |
| 4 Brookdale Estate     | MON      | HVY   | PP            | 14.9.90     | 0             | -         |
| 14a Capel Nature Res   | SWC      | CAP   | NR            | 18.9.97     | 32            | good      |
| 14b Capel Nature Res   | SWC      | CAP   | NR            | 18.9.97     | 1             | poor      |
| 15 Capel Nature Res    | SWC      | CAP   | NR            | 18.9.97     | 3             | moderate  |
| 16a Capel Nature Res   | SWC      | CAP   | NR            | 10.9.97     | 1             | poor      |
| 16b Capel Nature Res   | SWC      | CAP   | NR            | 12.9.97     | 6             | moderate  |
| 16c,d Capel Nature Res | SWC      | CAP   | NR            | 12.9.97     | 84            | good      |
| 16e Capel Nature Res   | SWC      | CAP   | NR            | 12.9.97     | 0             | poor      |
| 17 Capel Nature Res    | SWC      | CAP   | NR            | 18.9.97     | 0             | poor      |
| 10 Spur Rd             | SWC      | CAP   | PP            | 2.9.92      | 120           | -         |
| 11 Loc 4913            | SWC      | CAP   | PP            | 30.9.92     | 68            | -         |
| 12 Loc 4108            | SWC      | CAP   | PP            | 23.9.92     | 150           | -         |
| 15 Wonnerup Rd         | SWC      | BSN   | -             | -           | -             | -         |
| 17 Wellesley Rd        | MON      | HVY   | PP            | -           | 40+           | -?        |
| 18 Riverdale NR        | MON      | HVY   | NR            | -           | -             | -         |
| 21 Ludlow              | SWC      | BSN   | -             | 11.11.86    | -             | -         |
| 3a,b Gavins Rd         | SWC      | CAP   | Road, Utility | 1.10.97     | 0             | poor      |
| Lindberg Rd            | SWC      | BSN   | PP            | 10.9.97     | 100+          | good      |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown

## Management Requirements

## Research Requirements

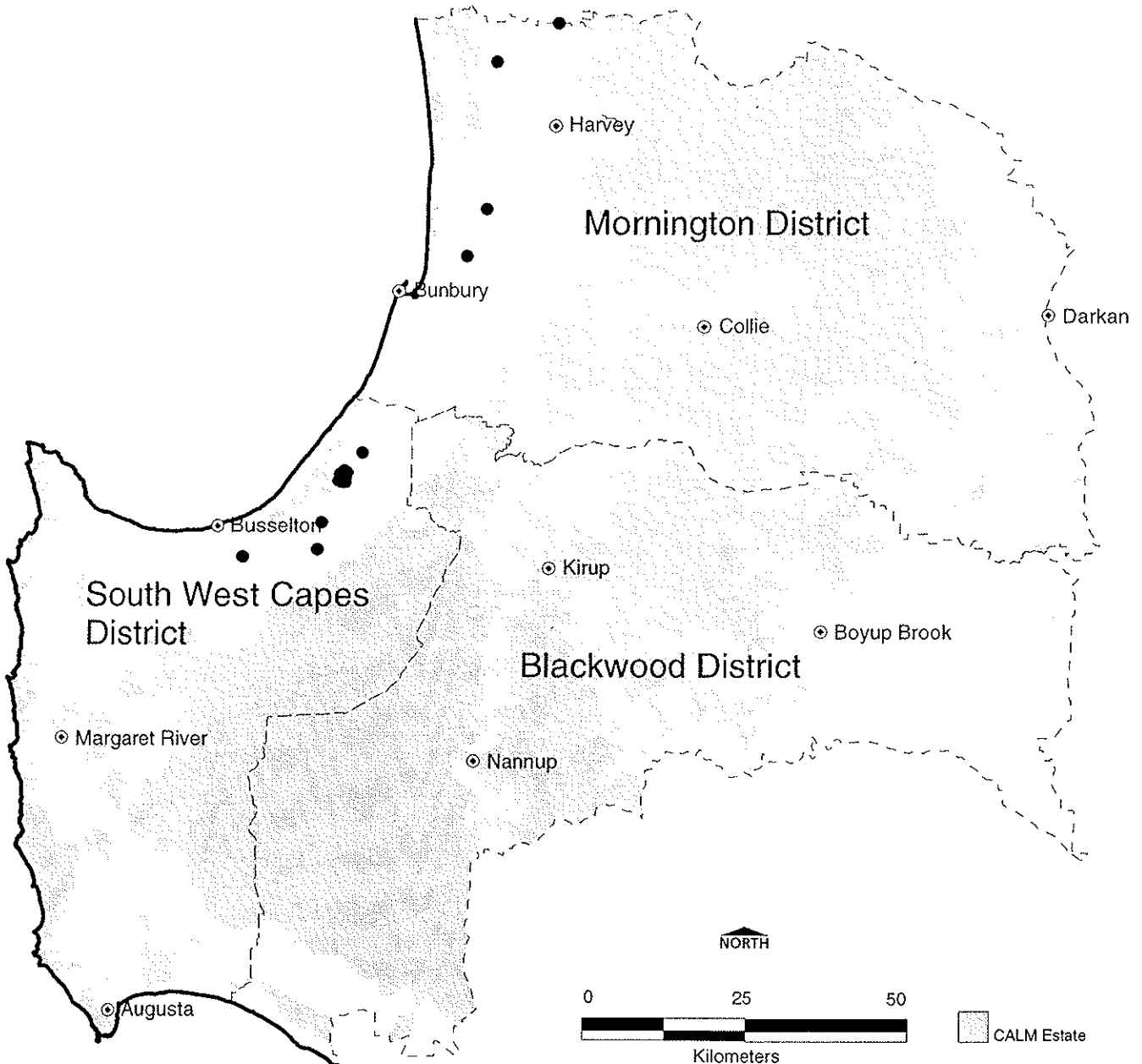
Germination technique required: Seed was collected by K. Dixon in 1987 from Sue's Rd but resulted in no successful germinants

## References

Hoffman, N. and Brown, A. (1998) *Orchids of South-west Australia*. Revised 2<sup>nd</sup> edition with supplement. University of Western Australia Press, Nedlands.



# Central Forest Region Threatened Flora Management Plan



● ***Drakaea elastica***

## *Drakaea micrantha* Hopper & A.P. Brown ms

## ORCHIDACEAE

Dwarf Hammer Orchid

*Drakaea micrantha* ms is a tuberous herb which, due to its inconspicuous nature, has been collected infrequently. It has the smallest flower in *Drakaea* as its name suggests (the Greek *microanthus*, meaning 'little/small flower'). First collected in 1930 from East Porongurup, it was not collected again until 1970. Since then it has been collected spasmodically. The diminutive flower is only 12 - 25 mm long on a stem up to 30 cm. The 15 mm cordate leaves are silver grey with prominent green veins. The female wasp mimicking flowers are very similar to both the more common species *D. thinniphila* and *D. glyptodon* but differs sufficiently in small size and labellum (wasp abdomen) detail to be a separate species.

**Flowering Period:** September to early October

### Distribution and Habitat

*Drakaea micrantha* ms has been collected spasmodically over a wide area from Perth to Albany in open sandy patches in Jarrah-Banksia woodland. Generally, populations are difficult to relocate, especially as they do not necessarily flower every year. This species is currently known from several thousand plants over wide geographical range, with secure populations in the Frankland NP. Often found associated with *Kunzea ericifolia* thickets adjacent to winter-wet swamps.

### Conservation Status

Declared Rare Flora - Vulnerable

### Known Populations

| Population             | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------------------|----------|-------|-------------|-------------|---------------|-----------|
| 2 Lot 2, Wellington Rd | MON      | HVY   | PP          | 23.10.91    | 2             | -         |
| 3 Lot 31, Bernbrook Rd | MON      | HVY   | PP          | 16.9.87     | 3             | now       |
| 4a Adelaide Rd         | SWC      | AMR   | SF          | 10.10.97    | 13            | good      |
| 4b Mowen Rd            | SWC      | AMR   | SF          | 10.10.97    | 20            | good      |
| 5 Plot GV161           | SWC      | AMR   | SF          | 28.10.92    | -             | -         |
| 8 Riverdale Rd         | MON      | HVY   | -           | 4.10.77     | -             | -         |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

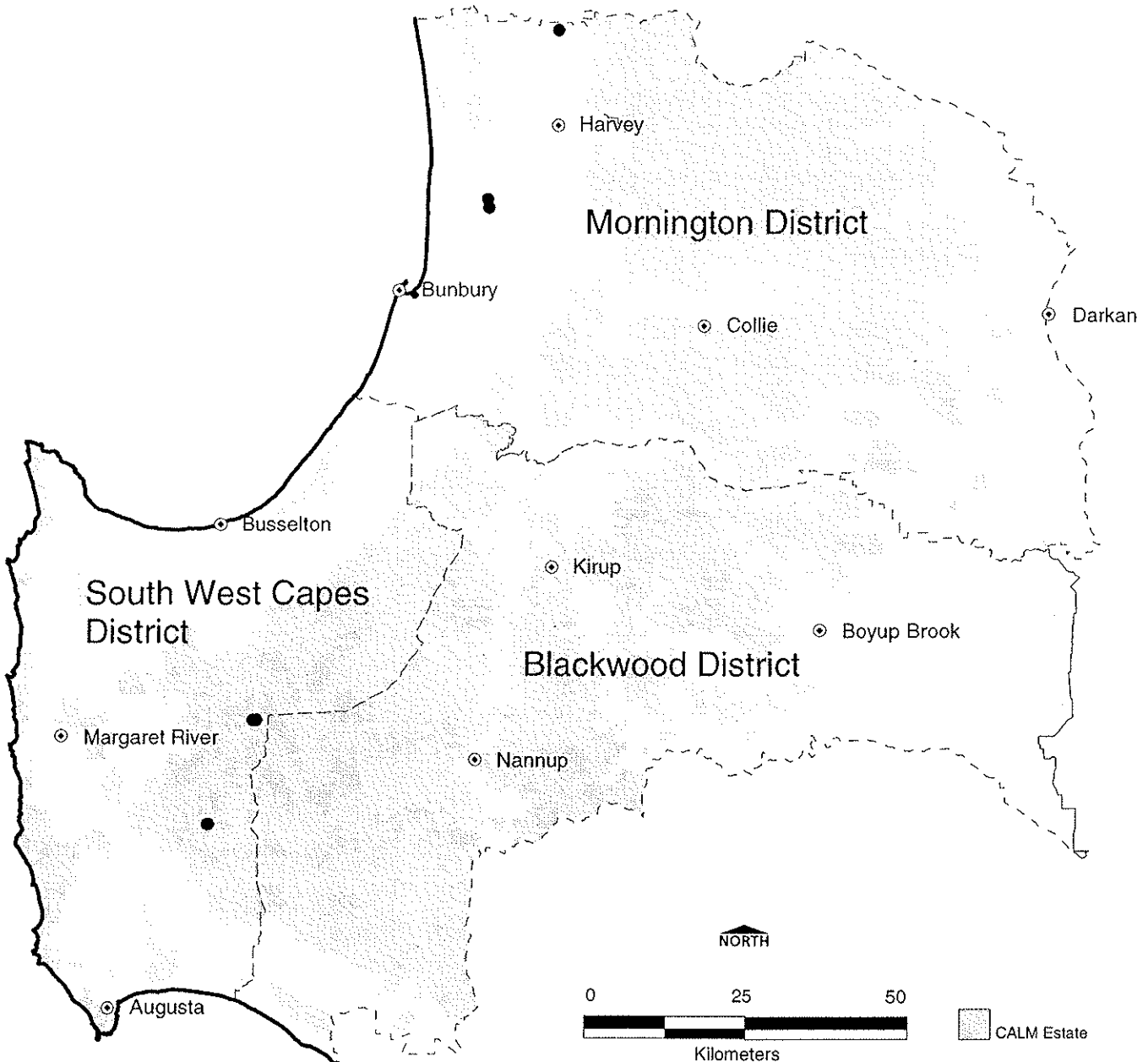
1. Further survey populations 2, 3, 6, 7 and 10
2. Monitor and control weeds on population 2, 3 and 10

### Research Requirements

### References

Hoffman, N. and Brown, A. (1998) *Orchids of South-west Australia*. Revised 2<sup>nd</sup> edition with supplement. University of Western Australia Press, Nedlands.

# Central Forest Region Threatened Flora Management Plan



● *Drakaea micrantha ms*

## *Dryandra mimica* A.S. George

## PROTEACEAE

Summer Honeypot

*Dryandra mimica* is a low prostrate shrub with a woody lignotuber and underground stems. The leaves are linear, up to 35 cm long, with rounded sinuses between the lobes. The under-surface of the leaves is densely hairy and has a prominent midrib. The upper surface is hairy in the juvenile leaves but becomes glabrous as they mature. Flowers are long with a tuft of long, white hairs at the apex, and are in erect flowerheads borne at ground level. The few densely hairy fruits are up to 2 cm long and 1 cm wide.

Superficially it resembles *D. nivea*, however the leaves have rounded sinuses, not V-shaped as in *D. nivea*. Furthermore *D. nivea* has brown flowers which arise from the margin of the receptacle, leaving a cavity after flowering, whereas *D. mimica* has yellow flowers which arise evenly spaced from the receptacle. It is most closely related to *D. vestita*, from which it is distinguished by its longer leaves and the apical tuft of hairs at the apex of the perianth limb.

**Flowering Period:** December to January

### **Distribution and Habitat**

*D. mimica* grows on sand in low, open woodlands in isolated pockets of vegetation in some parts of the Darling Range, near Perth: in the Whicher Range, south-east of Busselton, and in Mogumber, north of Perth. In the Perth area it is known only from Wattle Grove where 2 populations exist.

### **Conservation Status**

Declared Rare Flora - Endangered

### **Known Populations**

| Population      | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Whicher Range | SWC      | BSN   | SF          | 15.11.96    | 100+          | good      |

### **Response to Disturbance**

Appears fire tolerant. It regenerates from a small lignotuber after fire.

### **Susceptibility to *Phytophthora* Dieback**

Suspected to be vulnerable

### **Management Requirements**

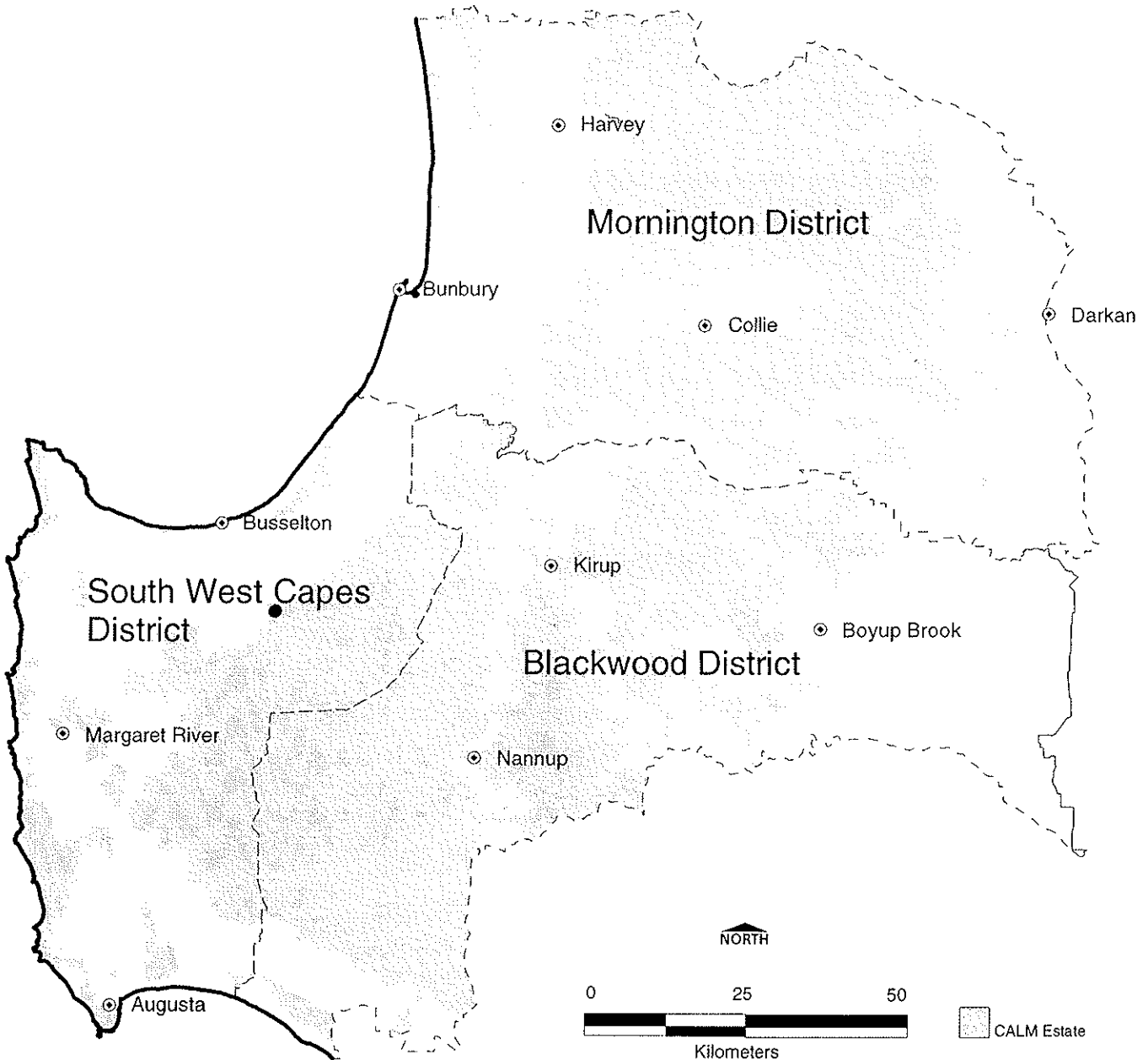
Has been successfully propagated by the Botanic Garden and Parks Authority

### **Research Requirements**

### **References**

George, A.S. (1984) *Dryandra mimica*, a new species of Proteaceae from south-west Western Australia. *Nuytsia* 5, 49-51.

# Central Forest Region Threatened Flora Management Plan



● *Dryandra mimica*

*Dryandra nivea* (Labill.) R.Br. subsp. *uliginosa* A.S. George

PROTEACEAE

*Dryandra nivea* subsp. *uliginosa* is dense mound-forming shrub, that can grow to a height of 1.5m. The leaves are long 20 - 45cm, deeply pinnatipartite, and 7 - 10mm wide. Inflorescence is terminal well hidden at the base of the long leaves within the "mound" formation, involucral bracts ovate to oblong, sparsely pubescent to glabrous with a ciliate margin. Approximately 70 flowers per head, floral bracts linear, obtuse 4 - 5mm long, white-hirsute, the apex papillose.

**Flower Period:** September

**Distribution and Habitat**

This species occurs in areas to the east of Busselton and on the Scott River plain, it is found predominantly on winter-wet sandy clay flats over ironstone. Associated vegetation is generally a Proteaceous/Myrtaceous scrub over sedges.

**Conservation Status**

Declared Rare Flora – Endangered

**Known Populations**

| Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Scott NP         | SWC      | AMR   | NP          | 17.9.90     | -             | -         |
| 2 Ruabon NR        | SWC      | BSN   | NR          | 21.7.94     | -             | -         |
| 3a Tutanup Rd      | SWC      | BSN   | Shire       | 27.6.97     | 40            | good      |
| 3b Tutanup Rd      | SWC      | BSN   | Rail        | 27.6.97     | 100+          | good      |
| 4 Williamson Rd    | SWC      | BSN   | SF          | 19.11.96    | 100+          | good      |
| 5 Gvnr-Broome Rd   | SWC      | AMR   | Shire       | 20.11.96    | 100+          | good      |
| 6a Gale/Jindong Rd | SWC      | BSN   | NR          | 20.8.97     | 100+          | good      |
| 6b Gale/Jindong Rd | SWC      | BSN   | Shire       | 20.8.97     | 10            | good      |
| 7a Kohlhagen Rd    | SWC      | BSN   | SF          | 17.10.95    | 0             | -         |
| 7b Kohlhagen Rd    | SWC      | BSN   | SF          | 15.11.96    | 0             | poor      |
| 8 Smith Rd         | SWC      | BSN   | SF          | 15.11.96    | 100+          | good      |
| 9a Tutanup Rd      | SWC      | BSN   | Shire       | 27.6.97     | 50+           | good      |
| 9b Tutanup Rd      | SWC      | BSN   | Rail        | 27.6.97     | 100+          | good      |
| 9c Loc. 1773       | SWC      | BSN   | PP          | 21.10.97    | 20            | mod       |
| 9d Loc. 3194       | SWC      | BSN   | PP          | 21.10.97    | 20            | mod       |
| 10 Princefield Rd  | SWC      | BSN   | Shire       | 29.8.97     | 6             | mod       |
| 11 Loc. 4264       | SWC      | AMR   | -           | 19.1.96     | -             | -         |
| 12 Oates Rd        | SWC      | BSN   | Shire       | 8.7.96      | 2             | poor      |
| 13 Price Rd        | SWC      | BSN   | Shire       | 20.8.97     | 15            | mod       |
| 14 Loc. 1783       | SWC      | BSN   | VCL         | 30.4.98     | 50+           | good      |
| 15 Beenup          | SWC      | AMR   | PP          | 16.12.97    | 100+          | good      |

**Response to Disturbance**

Killed by fire, regenerates well from seed post-fire.

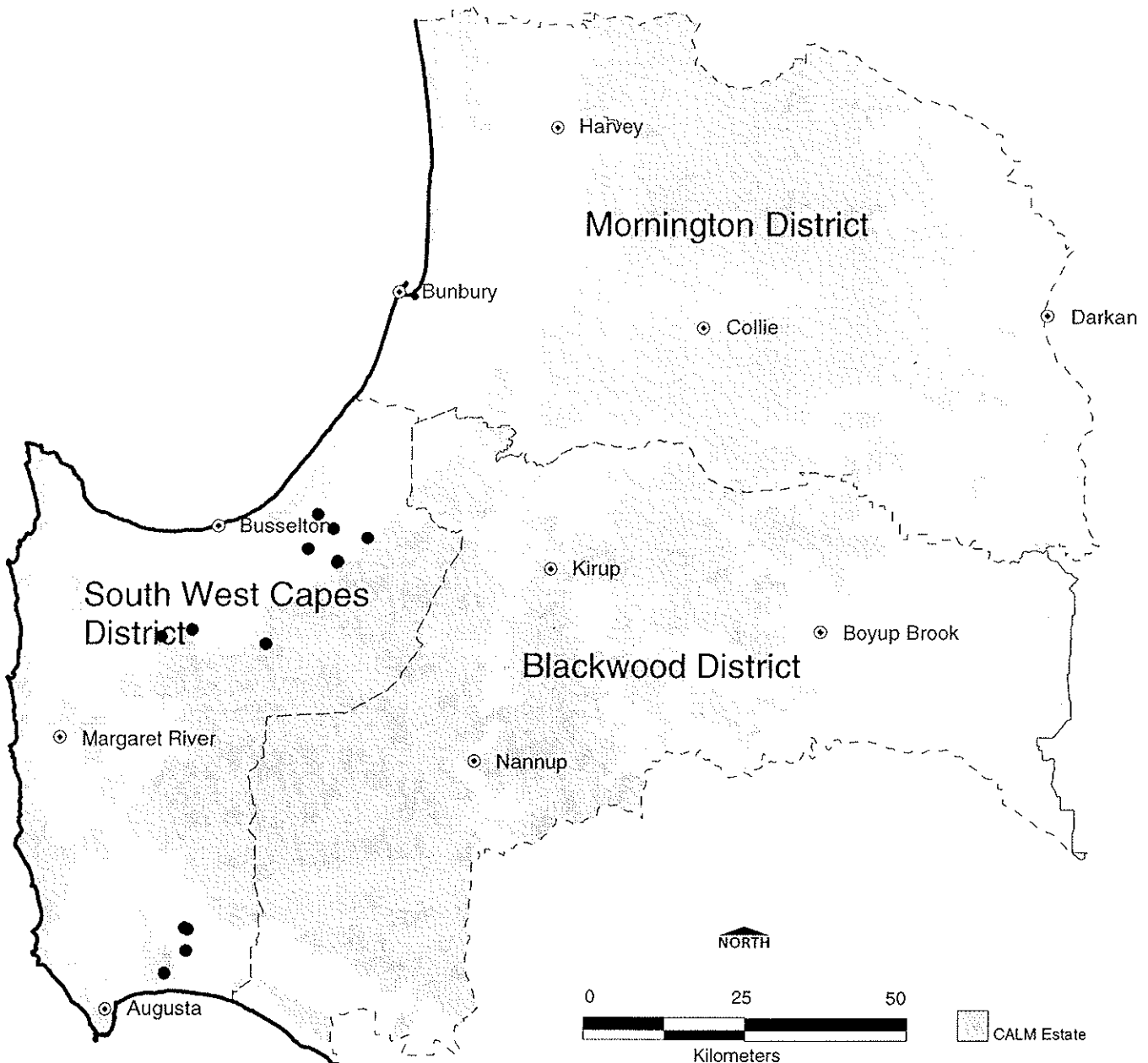
**Susceptibility to *Phytophthora* Dieback**

Susceptible

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



- *Dryandra nivea* subsp. *uliginosa*

*Dryandra squarrosa* R.Br. subsp. *argillacea* A.S. George

PROTEACEAE

*Dryandra squarrosa* subsp. *argillacea* is a tall, slender densely branched shrub growing to 4 m. The leaves are linear-lanceolate, stiff, 8 - 13 cm long with toothed notches 4 - 8 cm long. The flowers heads are yellow, small (ca. 2 cm wide) and are surrounded by numerous lanceolate or linear bracts with recurved tips.

**Flowering Period:** July to August

**Distribution and Habitat**

This species occurs on the southern margin of the Swan Coastal Plain in a number of locations at Ruabon, Tutunup. Many of the populations are very close to each other. Habitat preference appears to be winter-wet clay over ironstone, with associated vegetation Jarrah shrubland or Proteaceous/Myrtaceous heath over sedges.

**Conservation Status**

Declared Rare Flora – Vulnerable

**Known Populations**

| Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Smith Rd         | SWC      | BSN   | SF          | 22.1.96     | 1000's        | good      |
| 2a Tutunup Rd      | SWC      | BSN   | Shire       | 27.6.97     | 200+          | poor      |
| 2b Tutunup Rd      | SWC      | BSN   | Rail        | 27.12.95    | 20            | poor      |
| 3a Tutunup Rd      | SWC      | BSN   | Shire       | 27.6.97     | 0+            | mod       |
| 3b Tutunup Rd      | SWC      | BSN   | Rail        | 27.6.97     | 50+           | mod       |
| 3c Loc. 3203       | SWC      | BSN   | PP          | 2.1.98      | 100+          | mod       |
| 3d Loc. 1773       | SWC      | BSN   | PP          | 21.10.97    | 100+          | good      |
| 3e Loc. 3194       | SWC      | BSN   | PP          | 21.10.97    | 100+          | good      |
| 4a Williamson Rd   | SWC      | BSN   | SF          | 15.10.95    | -             | -         |
| 4b Williamson Rd   | SWC      | BSN   | SF          | 15.10.95    | -             | -         |
| 5 Oates Rd         | SWC      | BSN   | Shire       | -           | -             | -         |
| 6 Gale/Jindong Rd  | SWC      | BSN   | NR          | 20.8.97     | 100+          | mod       |
| 7 Kohlhagen Rd     | SWC      | BSN   | SF          | 20.8.97     | 50+           | poor      |
| 8a Treeton Block   | SWC      | BSN   | SF          | 20.8.97     | 100+          | mod       |
| 8b Loc. 2675       | SWC      | BSN   | PP          | -           | -             | -         |
| 9 McCorkhill Block | BWD      | Nan   | SF          | -           | -             | -         |
| 10 Loc. 1784       | SWC      | BSN   | VCL         | 29.8.97     | 23            | good      |
| 11 Butcher Rd      | SWC      | BSN   | Shire       | 2.1.98      | 14            | poor      |

**Response to Disturbance**

Killed by fire however, regenerates from seed post-fire.

**Susceptibility to *Phytophthora* Dieback**

Susceptible.

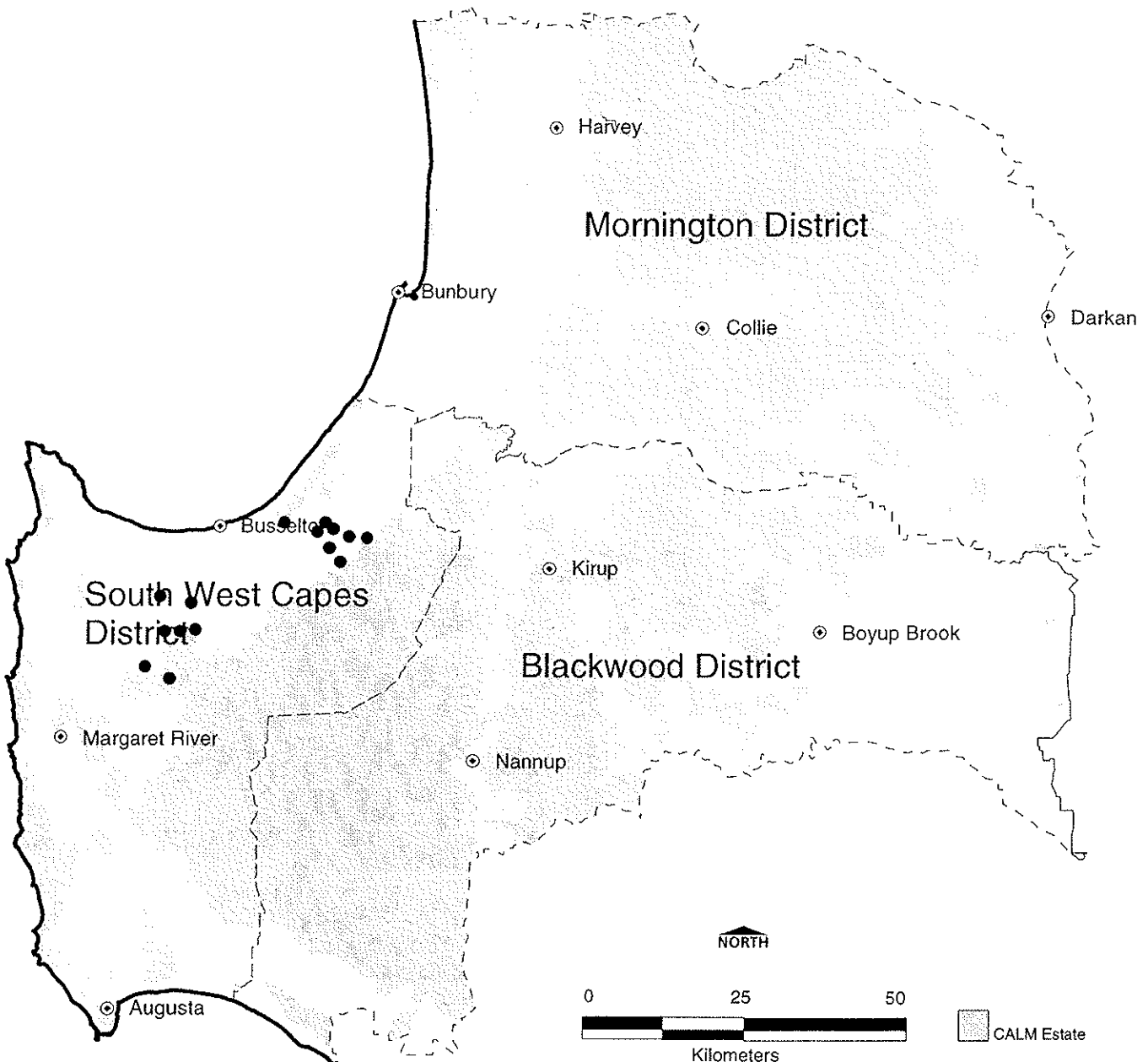
**Management Requirements**

1. Acquisition of some private land.
2. Urgent additional surveys at the base of the Whicher Range
3. Attempt to cultivate and existing populations actively managed. (Seed collected in 93)

**Research Requirements**



# Central Forest Region Threatened Flora Management Plan



- *Dryandra squarrosa* subsp. *argillacea* ms

*Eleocharis keigheryi* K.L. Wilson

CYPERACEAE

Rhizomatous, clumped perennial, grass-like of herb (sedge), to 0.4 m high. Flowers green.

**Flowering Period:** -August to November.

**Distribution and Habitat**

A widely distributed species known from disjunct populations as far north as Lesueur and south to Boyanup. It occurs in transient pools. The Boyanup population was recorded in a water-filled clay pan surrounded by *Melaleuca lateritia* and herbs such as *Wurmbea*, *Tribonanthes* and *Leptocarpus* species.

**Conservation Status**

Declared Rare Flora - Vulnerable

**Known Populations**

| Population            | District | Shire | Land Status | Last Survey | No. of Plants | Condition                          |
|-----------------------|----------|-------|-------------|-------------|---------------|------------------------------------|
| 1 Railway Rd<br>1996. | SWC      | CAP   | Road        | 29.8.84     | Nil           | destroyed by gas pipeline works in |

**Response to Disturbance**

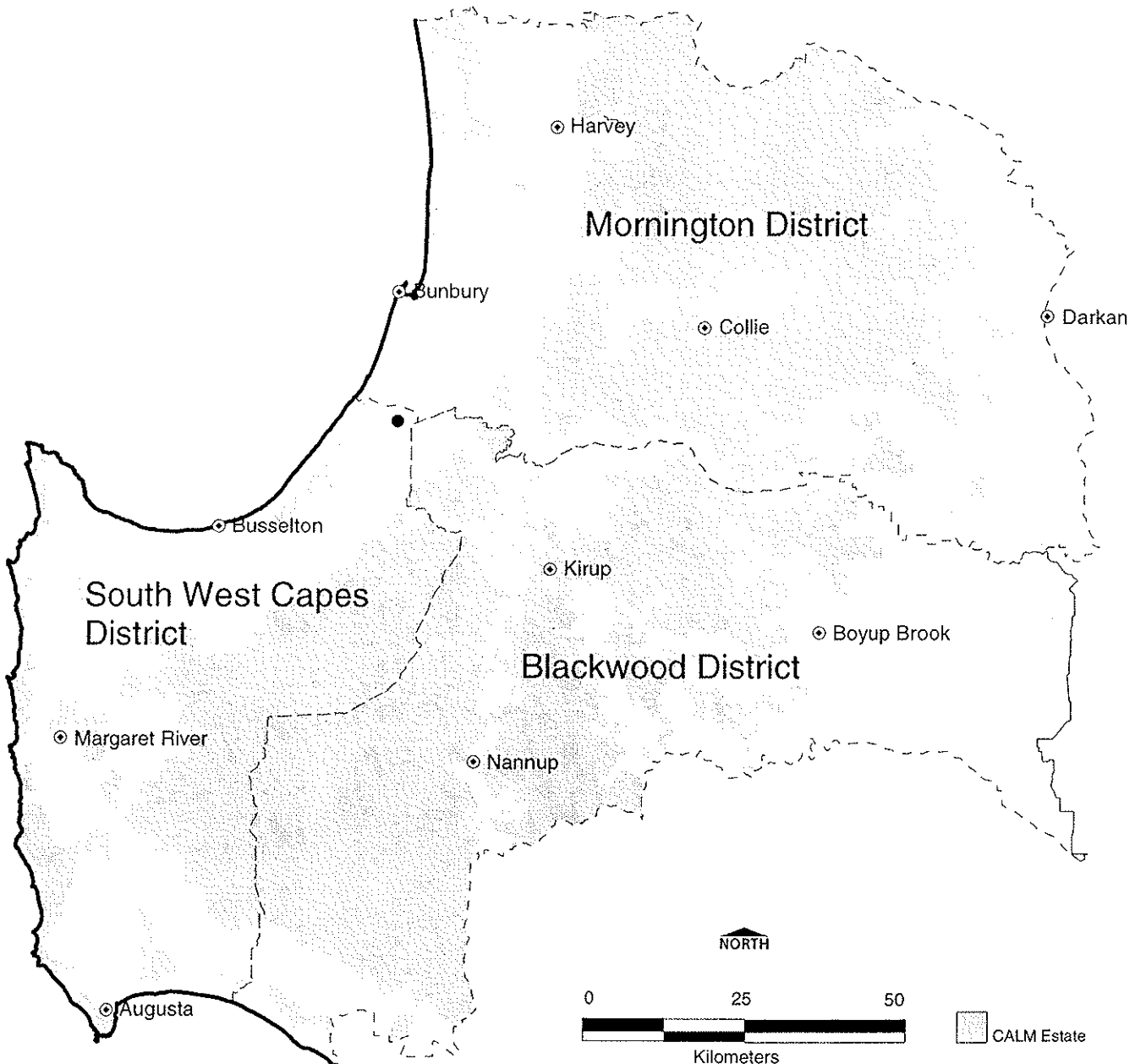
May be additional information arising from MW or SW populations

**Susceptibility to *Phytophthora* Dieback**

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● **Eleocharis keigheryi**

*Eucalyptus phylacis* L.A.S. Johnson & K.D. Hill

MYRTACEAE

A tree to 5 m with rough, coarsely flaky, light grey-brown bark overlying thick corky bark on trunk and large branches. Juvenile leaves are 5 cm long x 4 cm wide, disjunct, blue-grey and ovate to orbicular. Adult leaves are lanceolate to broad lanceolate, dull and 6 - 13 cm long and 1 - 3 cm wide. Leaves are densely reticulate between lateral veins, which are regular and usually closely spaced. Clusters of 7 - 11 flowers with terete peduncles 7-11 mm long and terete pedicels 1 - 2 mm long. The fruits are cup-shaped or hemispherical, 5 - 7 mm long, 7 - 9 mm in diameter with 3 - 4 locular. Style is persistent, often remaining attached to one valve in open fruit. The disc is flat or convex, with distinctive radial cracks crossing the disc, scar and hypanthium.

It is distinguished from *E. decipiens* by the shape of the juvenile leaves which are obtuse or rounded but not notched at the tip, and from the closely related *E. balanites* by the rounded operculum which is narrower than the hypanthium, and by the larger buds.

**Flowering Period:** February to March

**Distribution and Habitat**

Localised and uncommon, in a patch of mallee-heath country on undulating laterite, in an open area of otherwise *Corymbia calophylla*/*Eucalyptus marginata* woodland. The vegetation immediately surrounding the trees consists of a low heath of *Allocasuarina humilis*, *Daviesia cordata*, *Xanthorrhoea preissii*, *Dryandra nivea*, *Persoonia longifolia* and *Hakea lissocarpha*.

**Conservation Status**

Declared Rare Flora – Endangered

**Known Populations**

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Meclup   | SWC      | BSN   | Shire       | 6.11.96     | 1             | good      |

**Response to Disturbance**

Apparently not affected by prescribed burning (occurred in 1994 without detriment).

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

Current Interim Recovery Plan action items will be targeted.

**Research Requirements**

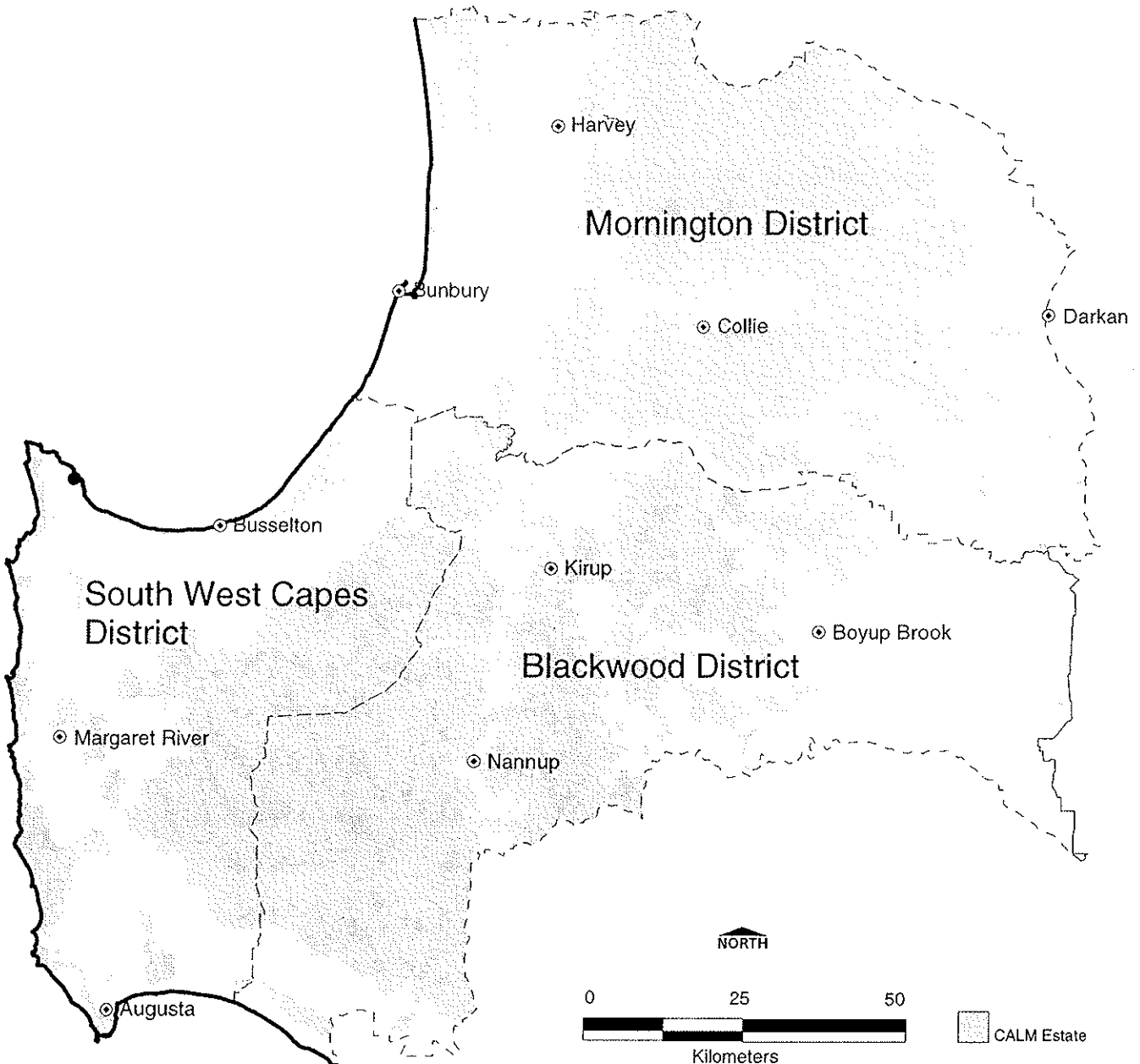
Seed was collected by the Botanic Garden and Parks Authority in 1994, however no germination occurred.

Current Interim Recovery Plan action items will be targeted.

**References**

Hill, K.D. and Johnson, L.A.S. (1992) Systematic studies in the eucalypts. 5. New taxa and combinations in *Eucalyptus* (Myrtaceae) in Western Australia. *Telopea* 4, 561-634.

# Central Forest Region Threatened Flora Management Plan



● **Eucalyptus phylacis**

## *Grevillea brachystylis* Meisn. subsp. *australis* Keighery

## PROTEACEAE

*Grevillea brachystylis* subsp. *australis* has prostrate vegetative branches and erect flowering branches to 1.5 m tall x 1 m wide. Leaves are linear to 20 cm. The flowers, red with a purple pollen presenter, are borne in small axillary inflorescences of 2-7 flowers.

*Grevillea brachystylis* species is a spreading, straggling, prostrate or erect shrub 0.4-1.8 m tall. Branches sometimes one sided. The branchlets are angular and have parallel ridges, soon becoming nearly round in cross section and they are sparsely hairy to hairy (occasionally smooth). Leaves are simple, linear to narrowly elliptical or sometimes narrowly obovate, sessile (no leaf stalk, attached directly to stem), 6-12 cm long x 2-7 mm wide and always have a conspicuous point at the apex. Leaf margins are usually curled under. Inflorescences are terminal or occasionally axillary, usually on short branches, sessile to pedunculate (with or without flower stalks), simple or sparingly branched. The receptacle is very oblique, sometimes lateral and 1.8-4.5 mm long.

**Flowering Period:** Late spring-summer peak.

### Distribution and Habitat

This species occurs only along the floodplain of the Blackwood River on the Scott Plain, where it occurs under *Corymbia calophylla* (Marri) along ephemeral creeklines on clay soils.

*G. brachystylis* subsp. *brachystylis* is similar and closely related to *G. brachystylis* subsp. *australis* but it only occurs on sandplains on the Swan Coastal Plain.

### Conservation Status

Declared Rare Flora - Vulnerable

### Known Populations

| Population          | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Scott River Rd    | SWC      | AMR   | NP          | 29.1.96     | 20+           | good      |
| 2 Payne/Courtney Rd | SWC      | AMR   | Shire       | 28.1.96     | 50+           | moderate  |

### Response to Disturbance

Killed by fire. Response to soil disturbance unknown.

### Susceptibility to *Phytophthora* Dieback

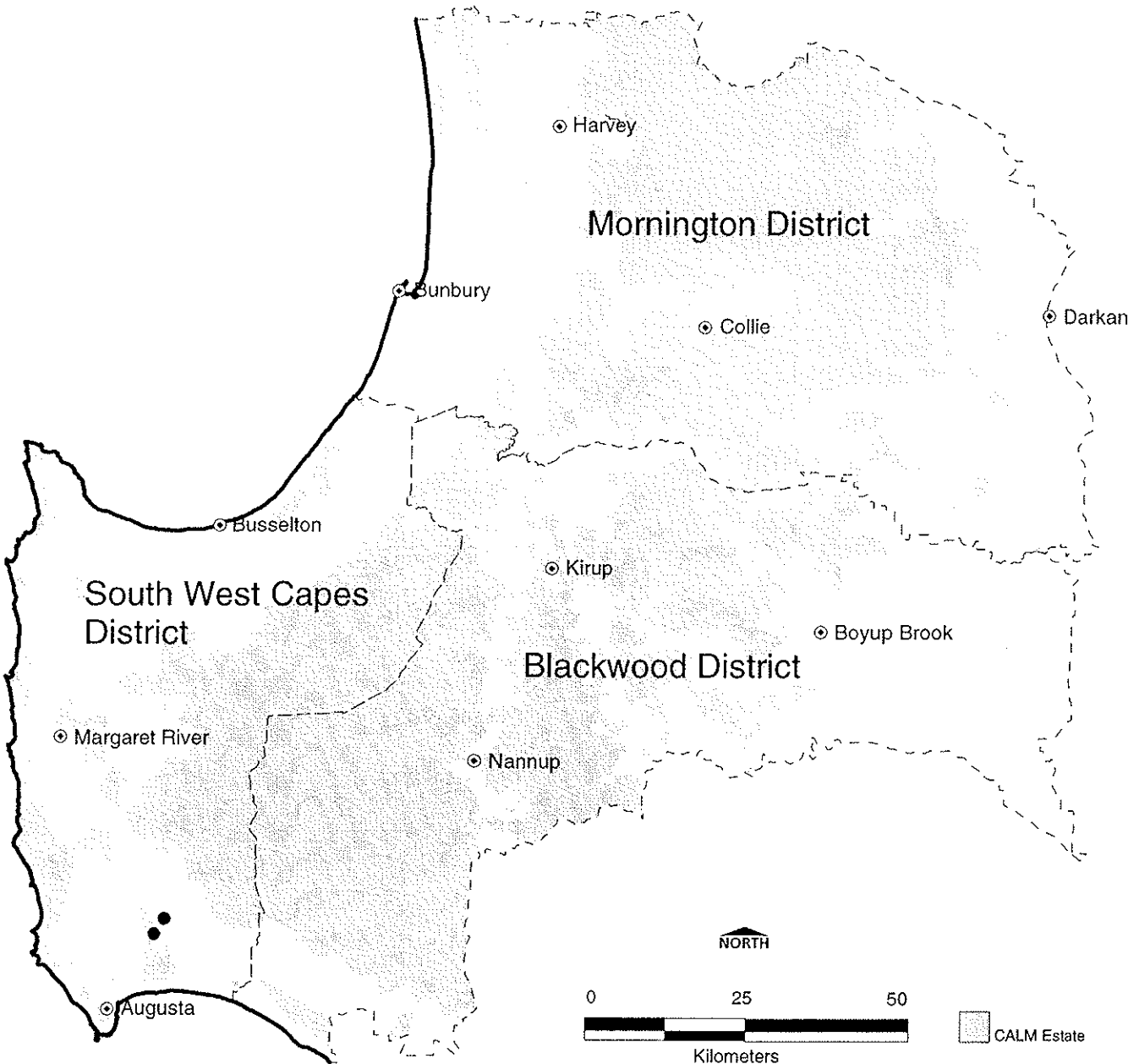
Unknown.

### Management Requirements

1. Further surveys in the uncleared bushland adjacent to the park are required.

### Research Requirements

# Central Forest Region Threatened Flora Management Plan



● *Grevillea brachystylis subsp. australis*

## *Grevillea elongata* P. Olde & N. Marriott

## PROTEACEAE

A spreading shrub 1.5 - 2 m high and up to 2.5 m wide. The branchlets are red, erect and may be glabrous or slightly silky haired, with longitudinal ribbing. The leaves are 2.5 - 5 cm long, glabrous and divaricately tripartite to pinnatipartite, sometime with lobes again divided. Leaves are sessile or on a short stem. The lobes are often of unequal length. The flowers are borne terminally or in leaf axils on simple or slightly branched cylindrical heads. Flowers are glabrous and white throughout with cream bracts. The perianth is 3.5 mm long and constricted below the limb and with an erect form. All tepals separate and roll back at anthesis.

It resembles *G. paniculata* but can be distinguished by the lack of channelling on the upper surface of the leaves, the larger floral bracts (2.8 - 3.4 mm long compared to 1mm) and the cylindrical rather than globose flower head.

**Flowering Period:** October to November

### Distribution and Habitat

It is restricted to the Ruabon-Busselton area, principally occurring on Busselton ironstone shrublands, but three populations are found on grey sands over ironstone abutting pine plantation.

### Conservation Status

Declared Rare Flora – Critically Endangered

Its habitat was probably originally highly restricted and has been depleted by land clearing.

### Known Populations

| Population        | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1a Tutunup Rd     | SWC      | BSN   | Shire       | 27.6.97     | 50+           | good      |
| 1b Tutunup Rd     | SWC      | BSN   | Rail        | 27.6.97     | 100+          | good      |
| 1c Loc. 1773      | SWC      | BSN   | PP          | 23.10.97    | 100+          | good      |
| 1d Loc. 3194      | SWC      | BSN   | PP          | 23.10.97    | 100+          | good      |
| 1e Loc. 3203      | SWC      | BSN   | PP          | 2.1.98      | 100+          | good      |
| 2a Tutunup Rd     | SWC      | BSN   | Shire       | 27.6.97     | 50+           | good      |
| 2b Tutunup Rd     | SWC      | BSN   | Rail        | 27.6.97     | 100+          | good      |
| 2c Tutunup Rd     | SWC      | BSN   | Road        | 27.6.97     | 100+          | moderate  |
| 2d Tutunup Rd     | SWC      | BSN   | Rail        | 27.6.97     | 100+          | moderate  |
| 3a Oates Rd       | SWC      | BSN   | Shire       | 29.8.97     | 60+           | moderate  |
| 3b Oates Rd       | SWC      | BSN   | Water       | 29.8.97     | -             | moderate  |
| 4 Gulberti Rd     | SWC      | BSN   | Road        | 29.8.97     | 44            | moderate  |
| 5 Loc. 4102       | SWC      | BSN   | PP          | 10.10.97    | 3             | moderate  |
| 6a Willcocks Plnt | SWC      | BSN   | SF          | 10.11.97    | 12            | good      |
| 6b Willcocks Plnt | SWC      | BSN   | SF          | 1999        | 62            | moderate  |
| 6c Willcocks Plnt | SWC      | BSN   | SF          | 1999        | 25            | moderate  |
| 7 Loc 4049        | SWC      | BSN   | NR          | 1999        | 2             | good      |

### Response to Disturbance

It appears that the species responds well to significant soil disturbance.

### Susceptibility to *Phytophthora* Dieback

Testing indicated that not susceptible under laboratory conditions. However, testing in the field has proved positive on two occasions. It may be, therefore, that the species is able to resist the disease when healthy but succumbs when under stress in the field.

### Management Requirements

1. Further survey of Willcocks plantation populations required.
2. Acquisition and fencing on private property locations to be considered.
3. DRF markers for Willcocks plantation populations.



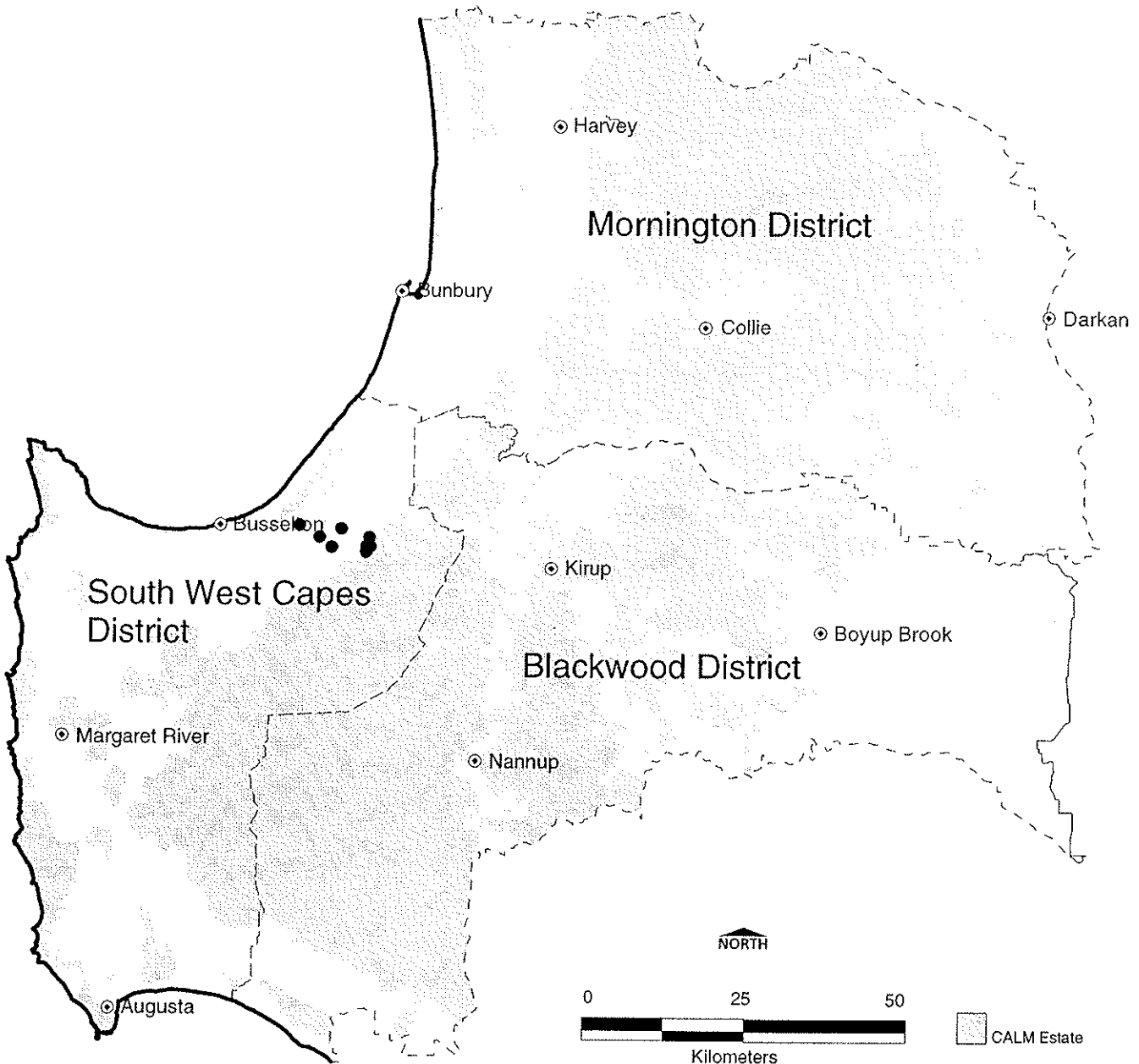
### Research Requirements

Has been propagated from cuttings in 1986, however while the plants grew vigorously for several seasons, they eventually died. Further research into propagation methods.

### References

- Olde, P.M. and Marriott, N.R. (1995) *The Grevillea Book 2*: 142-143. Kangaroo Press, Kenthurst N.S.W.
- Phillimore, R., Stack, G. and English, V. (1999) Ironstone Grevillea – *Grevillea elongata* - Interim Recovery Plan No. 54, Department of Conservation and Land Management, unpublished report.

# Central Forest Region Threatened Flora Management Plan



● **Grevillea elongata**

## *Grevillea maccutcheonii* Keighery & Cranfield

## PROTEACEAE

On maturity, *G. maccutcheonii* forms a dense, tall shrub to 2 m. The distinctive three lobed leaves encircle the stem. Flowers are large and red. Although distantly related to *Grevillea manglesioides*, *G. maccutcheonii* is distinguished by being completely glabrous on vegetative and floral organs, with rigid, stem clasping leaves and larger flowers.

*Grevillea maccutcheonii* was first recognised as being a new species in 1992 and was declared as rare flora in 1994.

**Flowering Period:** July to November

### Distribution and Habitat

Only one population of *G. maccutcheonii* is known to exist, that being in the Busselton area. It grows in shallow, red, brown, clay soils associated with the southern ironstone outcrop formations found at the base of Whicher Range. It may have been more common but is now extremely rare due to agricultural clearing of the surrounding non-sheeted areas. Observed to grow on a mound of soil approximately one metre deep.

### Conservation Status

Declared Rare Flora – Critically Endangered

### Known Populations

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Oates Rd | SWC      | BSN   | Road        | 19.3.99     | 14            | good      |

### Response to Disturbance

Numerous seedlings developed following ground disturbance from roadside maintenance in 1995.

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

1. Placement of roadside DRF markers – done.
2. Protection from road maintenance activities – liaison with Busselton Shire and fencing of population have been done.
3. Acquisition of adjoining private property for population establishment.
4. Protect from grazing – fencing has been done.
5. Assess appropriate translocation sites.
6. Collection and storage of viable seed.
7. Localised publicity campaign.
8. Further survey of adjacent private property and nearby State Forest.
9. Liaison with the Botanic Garden and Parks Authority regarding plant propagation for translocation purposes.
10. Monitor population annually.

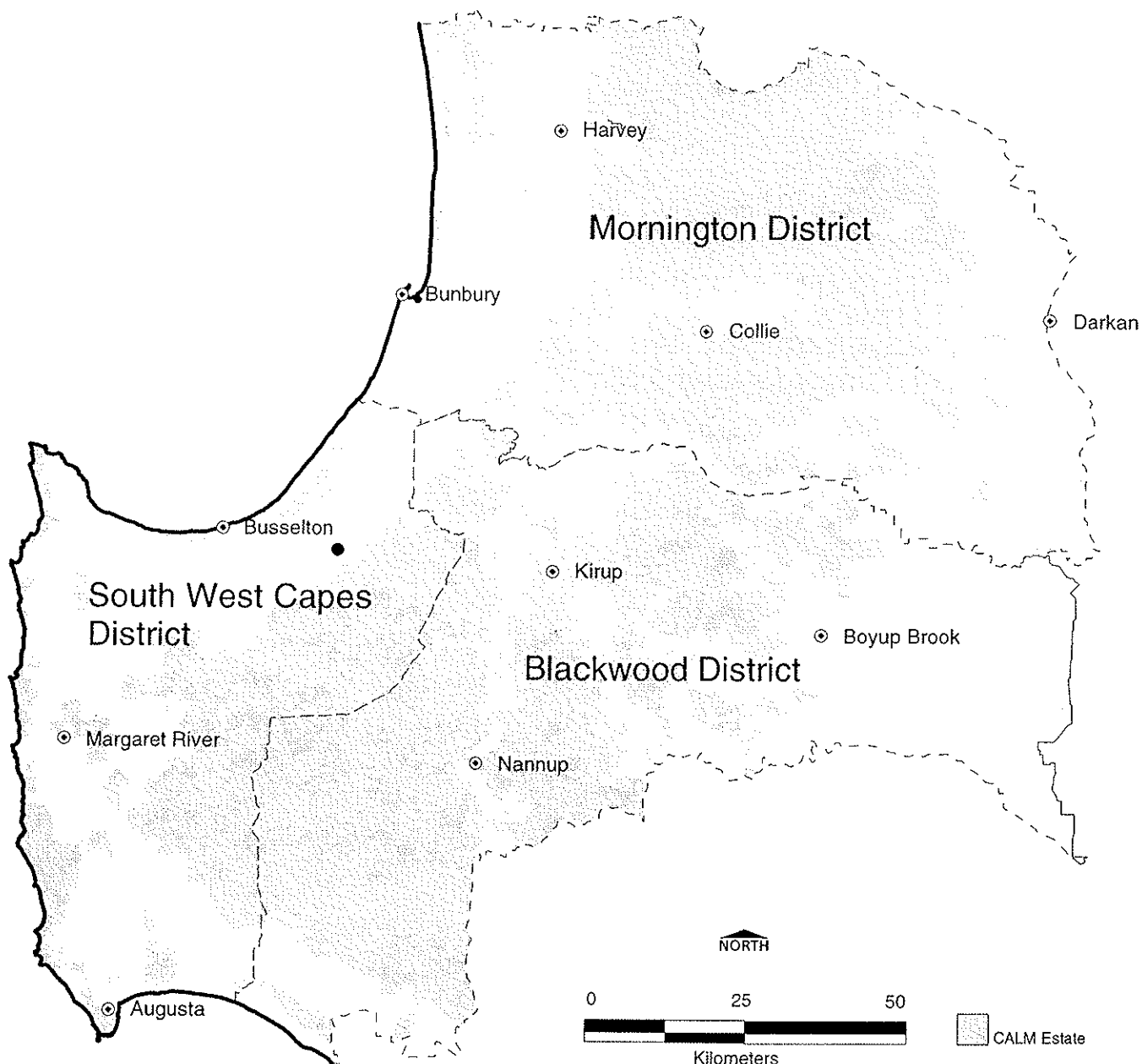
### Research Requirements

1. *Ex-situ* plant biology studies once new sites have established.

### References

Phillimore, R. and Papenfus, D. (1999) McCutcheon's Grevillea – *Grevillea maccutcheonii* - Interim Recovery Plan No. 51, Department of Conservation and Land Management, unpublished report.

# Central Forest Region Threatened Flora Management Plan



● *Grevillea maccutcheonii*

## *Grevillea rara* P. Olde & N. Marriott

## PROTEACEAE

*Grevillea rara* is an erect irregular shrub to 2m high, branchlets terete, densely pubescent. Leaves pinnatisect, primary leaf lobes usually 5 per leaf, weakly pungent, the upper surface smooth and glabrous; lower surface entirely enclosed by smoothly revolute margins. Inflorescence simple, subglobose, the rachis pubescent; bracts are broadly ovate; perianth actinomorphic and glabrous; pistil glabrous, the pollen presenter conical to truncate-conical; fruit rugose.

**Flowering Period:** Observed flowering in September

### Distribution and Habitat

At one stage thought to be extinct in the wild, this species was first collected near Collie in 1986, at a location that was subsequently submerged under the Harris River Dam. However it has since been relocated in adjacent land. The population occurs in moist brown gravelly soil in an area of Marri over *Acacia pulchella*, *Acacia drummondii*, *Bossiaea aquifolia* and *Calothamnus* sp.

### Conservation Status

Declared Rare Flora - Endangered

The only known occurrence is within a Water Reserve and is close to high use recreation areas. Cuttings struck from the original location are growing at Stawel, Victoria and at Mt. Annan Botanical Garden.

### Known Populations

| Population            | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1a Harris River Dam   | MON      | COL   | Water       | 15.9.97     | 50            | good      |
| 1b Harris River Dam   | MON      | COL   | Water       | 15.9.97     | 100+          | disturbed |
| 2 Harris River Dam Rd | MON      | COL   | SF, Water   | 15.9.97     | 260           | healthy   |
| 3 Victor Munt Drive   | MON      | COL   | SF          | 29.10.96    | 20            | healthy   |
| 4 Lake Ballingall     | MON      | COL   | SF          | 29.10.96    | 1             | healthy   |
| 5 Lewis Track         | MON      | COL   | SF          | 28.1.98     | 1000+         | healthy   |

### Response to Disturbance

Responds well to physical disturbance.

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

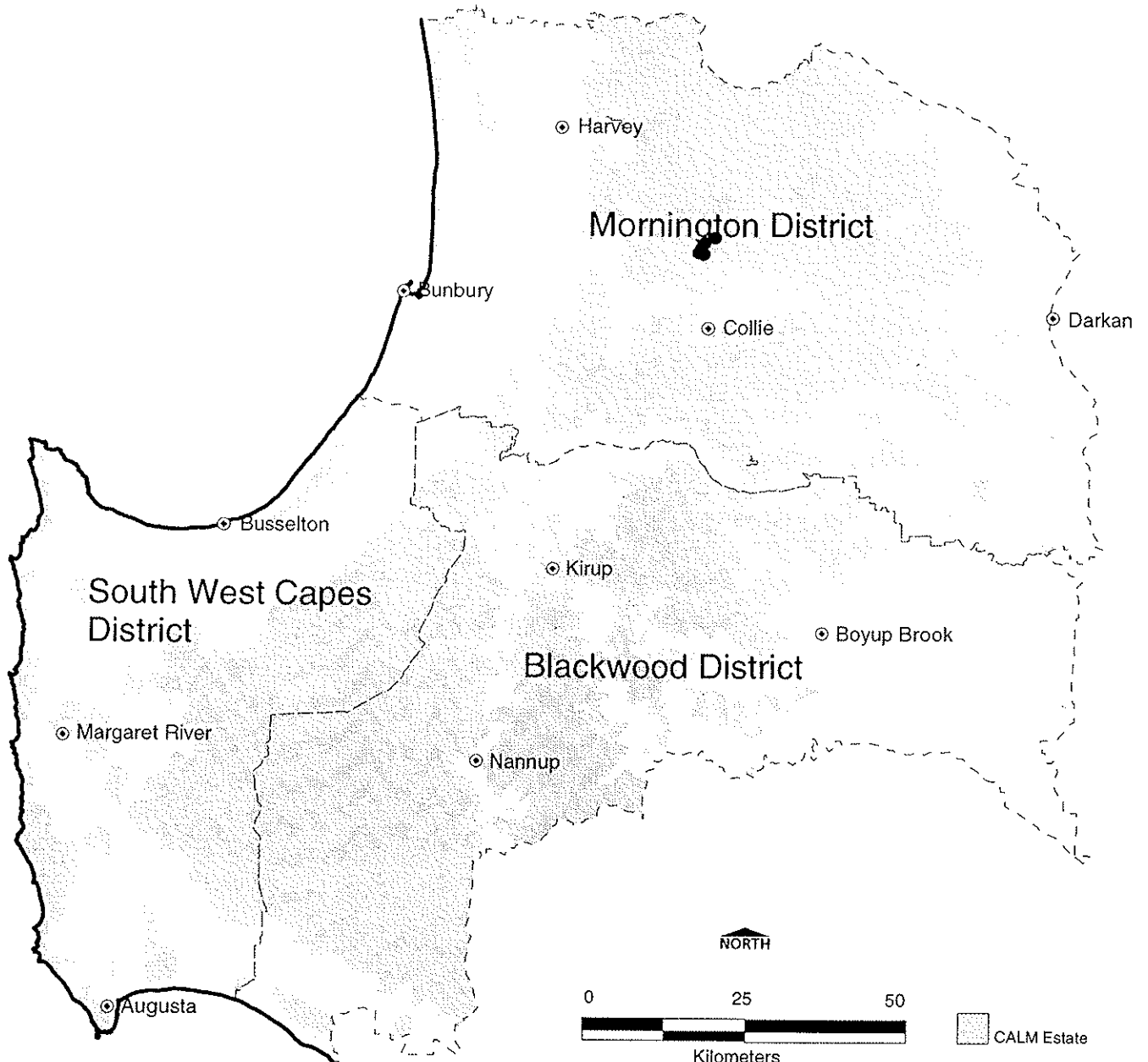
1. Further survey required.
2. Germplasm collection.
3. Continue liaison with other agencies.

### Research Requirements

### Reference:

Olde, P.M. and Marriott, N.R. (1995) *The Grevillea Book* 3: 130-131. Kangaroo Press, Kenthurst N.S.W.

# Central Forest Region Threatened Flora Management Plan



● **Grevillea rara**

*Jacksonia* sp. Collie (C.J. Koch 177)  
Now *J. velveta* Chappill ms

PAPILIONACEAE

**Flowering Period:**

**Distribution and Habitat**

**Conservation Status**

Declared Rare Flora - Endangered

**Known Populations**

| Population     | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Collie Basin | MON      | COL   | SF          | 18.2.98     | 25            | good      |

**Response to Disturbance**

Appears to respond well

**Susceptibility to *Phytophthora* Dieback**

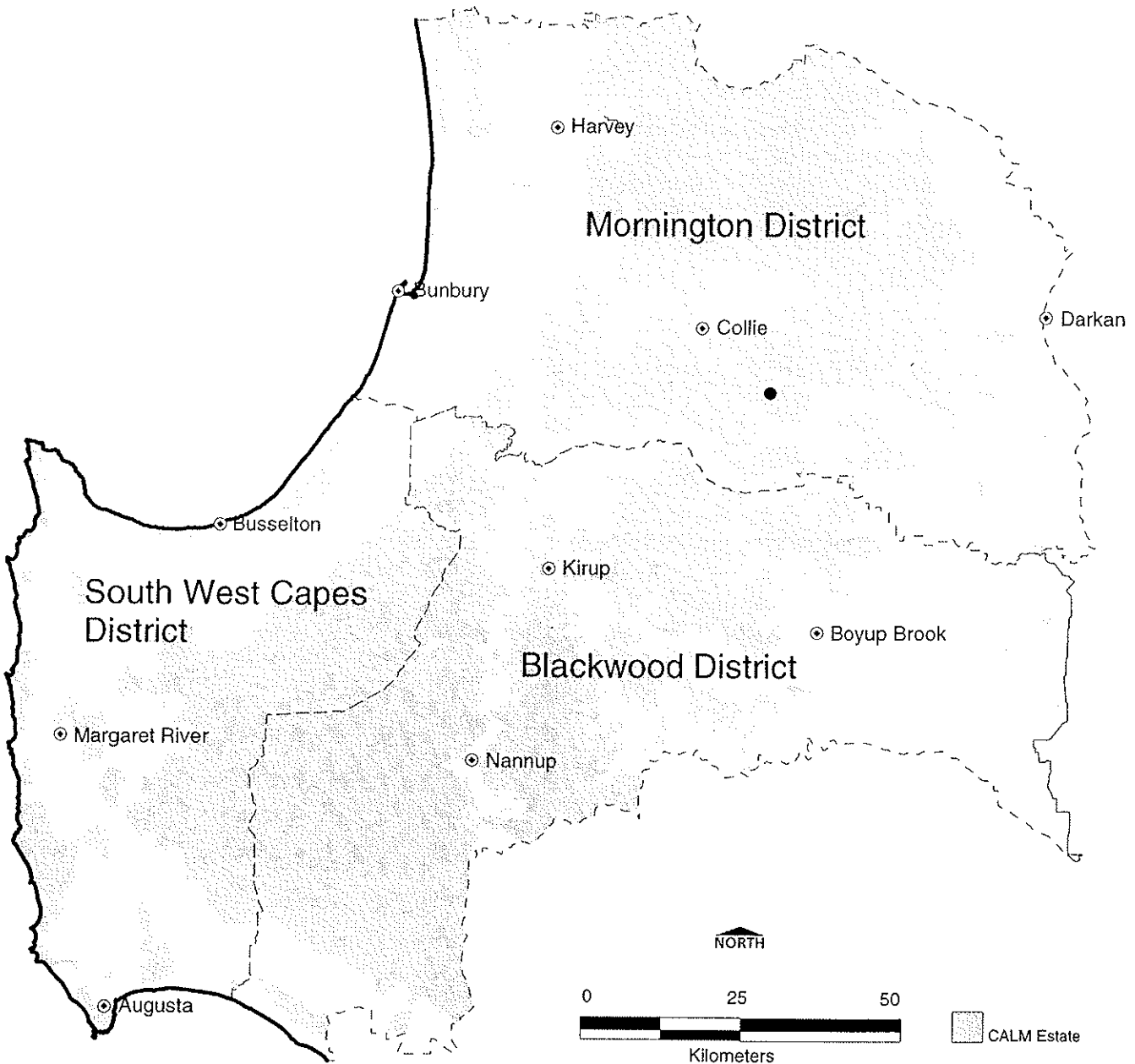
Unknown

**Management Requirements**

1. Liaison with Western Power re: service road maintenance
2. Further survey
3. Monitor weed invasion
4. Review fire regimes
5. Collection of germplasm material

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● ***Jacksonia sp. Collie* (C.J. Koch 177) [sp45]**



## *Kennedia macrophylla* (Meisn.) Benth.

## PAPILIONACEAE

Augusta Kennedia

*Kennedia macrophylla* is a creeping/climbing plant which usually forms a cover over low vegetation, although, if trees are present, it may climb to a height of up to 4 m. The young stems have spreading hairs while the older stems are woody. Leaves are made up of three broad glossy leaflets, each up to 7 cm long. The leaf stalks are about 4 cm long and have two leaf-like, very broad stipules at their base which are often joined to one another. Its flowers are 1.5+ cm in length and red with a yellow patch at the base of the largest petal. The individual flowers, each on stalks about 8 mm long, are in scattered groups of three along a common stalk which often is greater than 20 cm in length.

The large oval or round leaflets distinguish *K. macrophylla* from other *Kennedias* in the Augusta area.

**Flowering Period:** October to December.

### Distribution and Habitat

All known natural occurrences are in the Augusta-Cape Leeuwin area where the mean annual rainfall is about 1000mm. The species' geographical range is less than 5km. The plants occur close to the coast and the soil is black humus-rich sand, often amongst granite outcrops. Typically the vegetation is low coastal heath with bracken but sometimes peppermint (*Agonis flexuosa*) or karri (*Eucalyptus diversicolor*) is present.

### Conservation Status

Declared Rare Flora - Endangered

### Known Populations

| Population          | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 E of Leeuwin Rd   | SWC      | AMR   | reserve     | 13.3.92     | 12            | -         |
| 2 Albany/Deere St   | SWC      | AMR   | PP          | 15.01.78    | 13            | -         |
| 3 SW Augusta        | SWC      | AMR   | PP          | 16.3.89     | 15            | healthy   |
| 4 Near Flinders Bay | SWC      | AMR   | -           | 10.65       | occasional    | -         |

### Response to Disturbance

Probably killed by fires and regenerates from seed.

This *Kennedia* is well established in cultivation in WA and some other States. It is readily grown from seed provided the seeds are scarified before being sown but does not grow well from cuttings. Commercial supplies of seed and nursery plants are obtained from cultivated stocks rather than wild plants of the species.

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

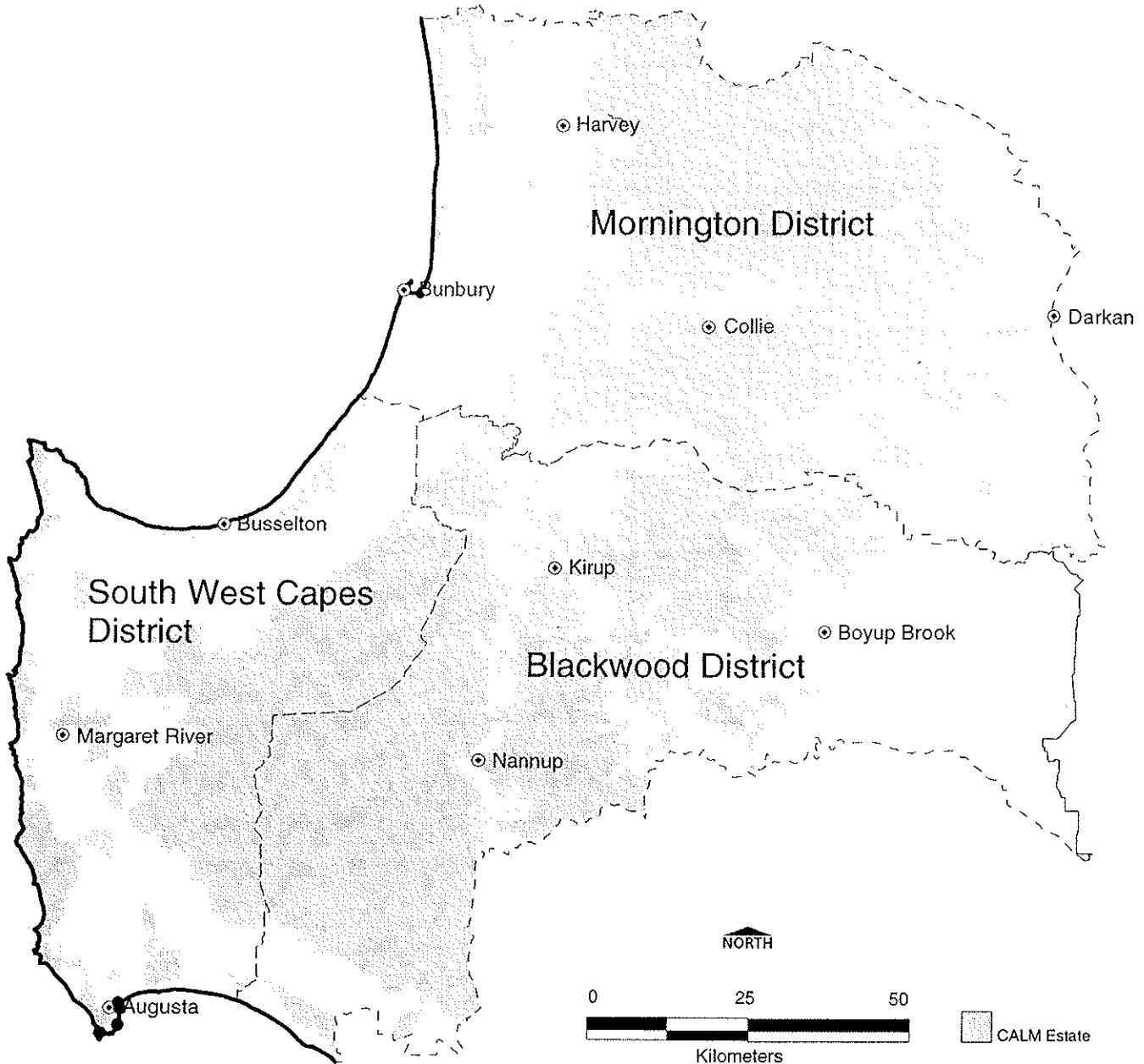
1. Further survey
2. Monitor and control weeds where required

### Research Requirements

### References

Rye, B.L. (1982) geographically restricted Plants of Southern Western Australia. Report No. 49, Department of Fisheries and Wildlife Western Australia.

# Central Forest Region Threatened Flora Management Plan



● **Kennedia macrophylla**

*Lambertia echinata* R.Br. subsp. *occidentalis* Keighery

PROTEACEAE

A shrub to 3m height, much branched at the base and with a few long erect floral branches. Two leaf types – vegetative and floral occur. The vegetative leaves are entire and linear-lanceolate with a pungent tip. The smaller floral leaves are either entire or lobed with 3 - 5 points. Flowers are yellow 2.3 – 2.6 cm long with recurved lobes. Floral bracts are thin and membranous, narrowly obovate with a sharp point at the apex. Inflorescences are 7 flowered and clustered at the apex of long floral branches.

**Flowering Period:** October to December

**Distribution and Habitat:** Confined to Whicher Range on shallow sandy soils over sheet ironstone with rich scrub heath, sedges, scattered Banksia and Marri.

**Conservation Status**

Declared Rare Flora - Critically Endangered

**Known Populations**

| Population       | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1a Williamson Rd | SWC      | BSN   | SF          | 19.10.95    | 7             | good      |
| 1b Williamson Rd | SWC      | BSN   | SF          | 15.5.98     | 1             | good      |

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Yes, area sprayed with Phosphite on two occasions in 1998.

**Management Requirements**

1. Conduct further surveys and regular monitoring
2. Implement necessary wildfire protection measures and fire management plan
3. Assist with translocation and other actions identified in IRP
4. Disseminate information
5. Continue disease management actions
6. Restrict access to the site
7. Preserve the genetic diversity of the species

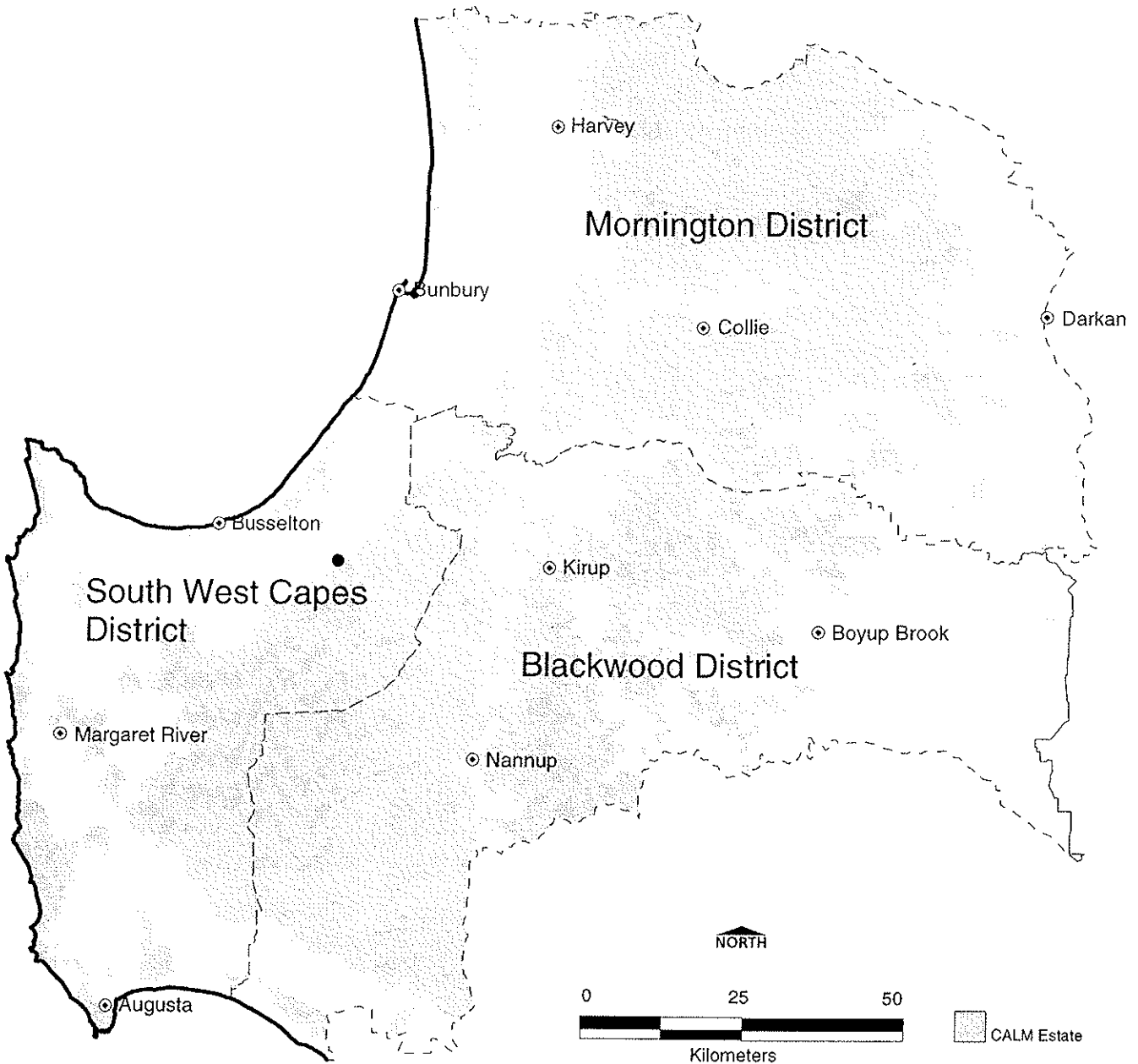
**Research Requirements**

Determine suitable propagation and establishment techniques.

**References**

Stack, G., Evans, R. and English, V. (1999) Western Prickly Honeysuckle – *Lambertia echinata* subsp. *occidentalis* - Interim Recovery Plan No. 36, Department of Conservation and Land Management, unpublished report.

# Central Forest Region Threatened Flora Management Plan



● **Lambertia echinata subsp. occidentalis**

## *Lambertia orbifolia* C.A. Gardner

## PROTEACEAE

### Round-leaf Honeysuckle

*Lambertia orbifolia* is a slender open erect shrub up to 5 m high x 2.5 m wide with densely pubescent young branches. The leaves are opposite, spreading, orbicular, slightly concave and 3 - 6 cm long and wide. The flowers are red, slightly hairy and are borne at the ends of branches in inflorescences of 4 - 6 flowers. Flowers are tubular and approximately 5 cm long, split into two lips at the end with a protruding style.

It can be distinguished from all other *Lambertia* species by the orbicular leaves.

**Flowering Period:** Peak flowering from December to March, but plants can be found in flower most of the year.

### Distribution and Habitat

It grows in sandy soil, generally with laterite, in the Scott River area. The Narrikup form occurs in low *Eucalyptus staeri* open woodland on lateritic loam. On the Scott Plain the species is normally found in dense shrub of *Agonis* or heath on sandy loam over laterite. Close to the coast *Lambertia orbifolia* forms the dominant component of the scrub.

### Conservation Status

Declared Rare Flora - Endangered

Many populations are threatened by dieback.

### Known Populations

| Population              | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-------------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1a Locations 4261, 4262 | SWC      | AMR   | PP          | 30.10.97    | 35            | moderate  |
| 1b Locations 4263, 4264 | SWC      | AMR   | PP          | 3.90        | 195           | -         |
| 4 Scott River           | SWC      | AMR   | NR          | 5.93        | 60            | -         |
| 6 Location 313 & 735    | SWC      | NAN   | PP          | 7.93        | 6748          | -         |
| 7 Location 449          | SWC      | AMR   | PP          | 10.91       | 10,000+       | -         |
| 5 Dennis Road           | SWC      | AMR   | Road        | 20.11.96    | 65            | good      |

### Response to Disturbance

Killed after fire or soil disturbance. Seed germination fire-stimulated

### Susceptibility to *Phytophthora* Dieback

Highly susceptible

### Management Requirements

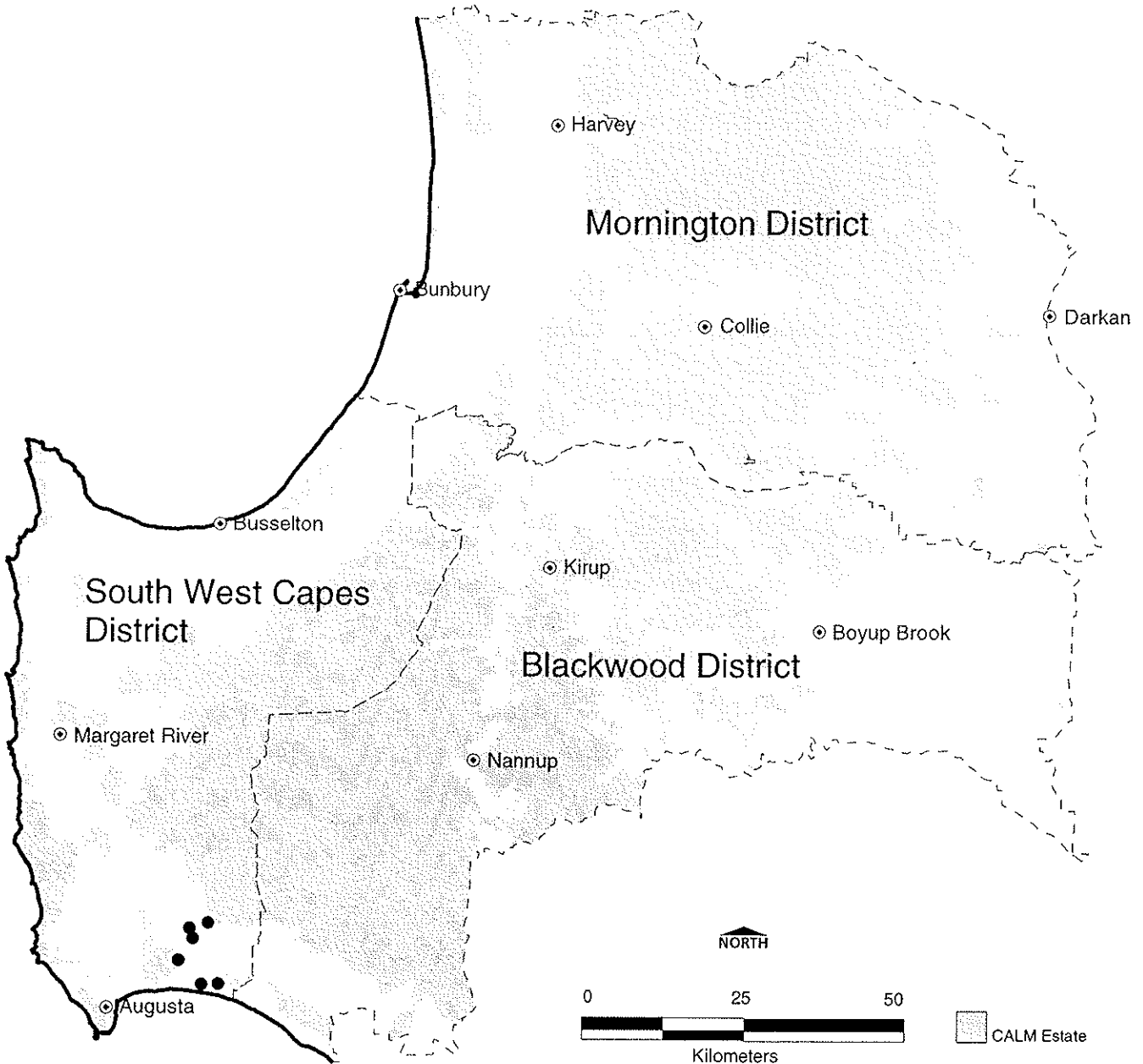
1. Search suitable habitat for new populations.
2. Placement and maintenance of roadside DRF markers.
3. Disease monitoring and phosphite application where required.

### Research Requirements

### References

Keighery, G. and Robinson, C. (1992) A Survey of Declared Rare Flora and Other Plants in Need of Special Protection of the Scott Plains. Unpublished Report to the Australian National Parks and Wildlife Service, Department of Conservation and Land Management, Western Australia.

# Central Forest Region Threatened Flora Management Plan



● **Lambertia orbifolia**

## *Laxmannia jamesii* Keighery

## ANTHERICACEAE

### James's Paperlily

*Laxmannia jamesii* is a stilted, rambling perennial herb with very slender wiry stems to 20 cm tall, which may spread to 300 mm. The narrow linear leaves which are scattered along the stems and clustered at the ends are terete, 9 – 20 mm long, acute with a translucent sheath. The inflorescences of this "Paper Lily" are 4 - 8 pedunculate terminal flowers and often sessile axillary flowers. The inflorescences are surrounded by 5 brown outer bracts (3 - 4 mm) and a single translucent inner bract 2 - 3 mm long. *L. sessiliflora* ssp. *australis* which also occurs around Albany is easily confused with James's Paperlily, but has only sessile inflorescences.

**Flowering Period:** April to July

### Distribution and Habitat

Currently it is known from several populations, mainly near Albany, but also from Narrikup, Denmark, Yelverton and the Whicher Range. *L. jamesii* appears to occur in small numbers only, the largest populations consisting of approximately 100 individuals. A number of populations occur in conservation reserves, however, most of these populations are very small. As its favoured habitat is common it is likely that with specific survey, more populations will be located. In addition the species tends to be cryptic and can be difficult to recognise.

*L. jamesii* occurs in sandy, peaty soils which may be seasonally damp, in an association of low closed heath over sedges.

### Conservation Status

Declared Rare Flora - Vulnerable

In total, fourteen populations are now known with six occurring on conservation reserves and one in an area of State Forest.

### Known Populations

| Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Yelverton Forest | SWC      | BSN   | SF          | 29.3.94     | -             | -         |
| 2 Whicher Range    | SWC      | BSN   | SF          | 29.3.94     | -             | -         |
| 3 Haddleton NR     | MON      | WEA   | NR          | 30.1.97     | -             | -         |
| 4 Reserve 31913    | MON      | WEA   | NR          | 7.2.97      | -             | -         |

### Response to Disturbance

Known to regenerate from seed after fire which kills the parent.

Response to soil disturbance unknown.

Is thought to be sensitive to weed invasion.

### Susceptibility to *Phytophthora* Dieback

Nil, according to submission for removal from DRF list on file by C. Robinson.

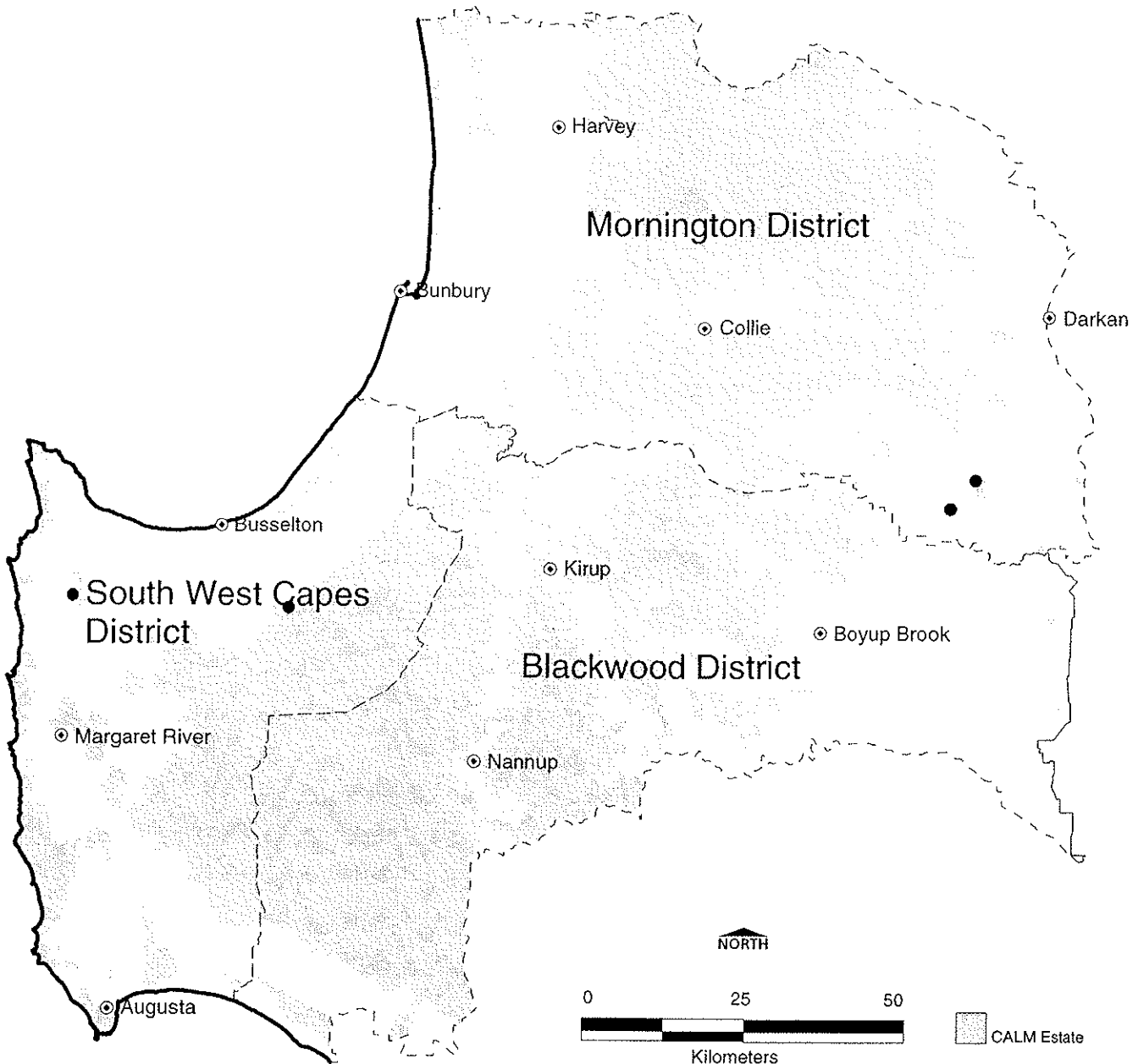
### Management Requirements

1. Inspect populations regularly.
2. Monitor and control weeds in roadside populations.

### Research Requirements

1. Assessment of fire regime impacts and inter-fire period for adequate seed production.
2. Examine response to low water availability (is thought to be susceptible).
3. Examine response to dieback.

# Central Forest Region Threatened Flora Management Plan



● *Laxmannia jamesii*



*Leptomeria dielsiana* Pilg.

SANTALACEAE

Diel's Currant Bush

Information relating to this species is very scarce and it has only been collected once. It is described as a shrub to 0.5 m tall.

**Flowering Period:** Unknown

**Distribution and Habitat**

Occurs within heath and/or scrubland in the Scott River area. Many searches of this area have been carried out in the last twenty years or so and this species has never been refound.

**Conservation Status**

Declared Rare Flora

**Known Populations**

| Population    | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Scott River | SWC      | AMR   | -           | 7.5.57      | -             | -         |

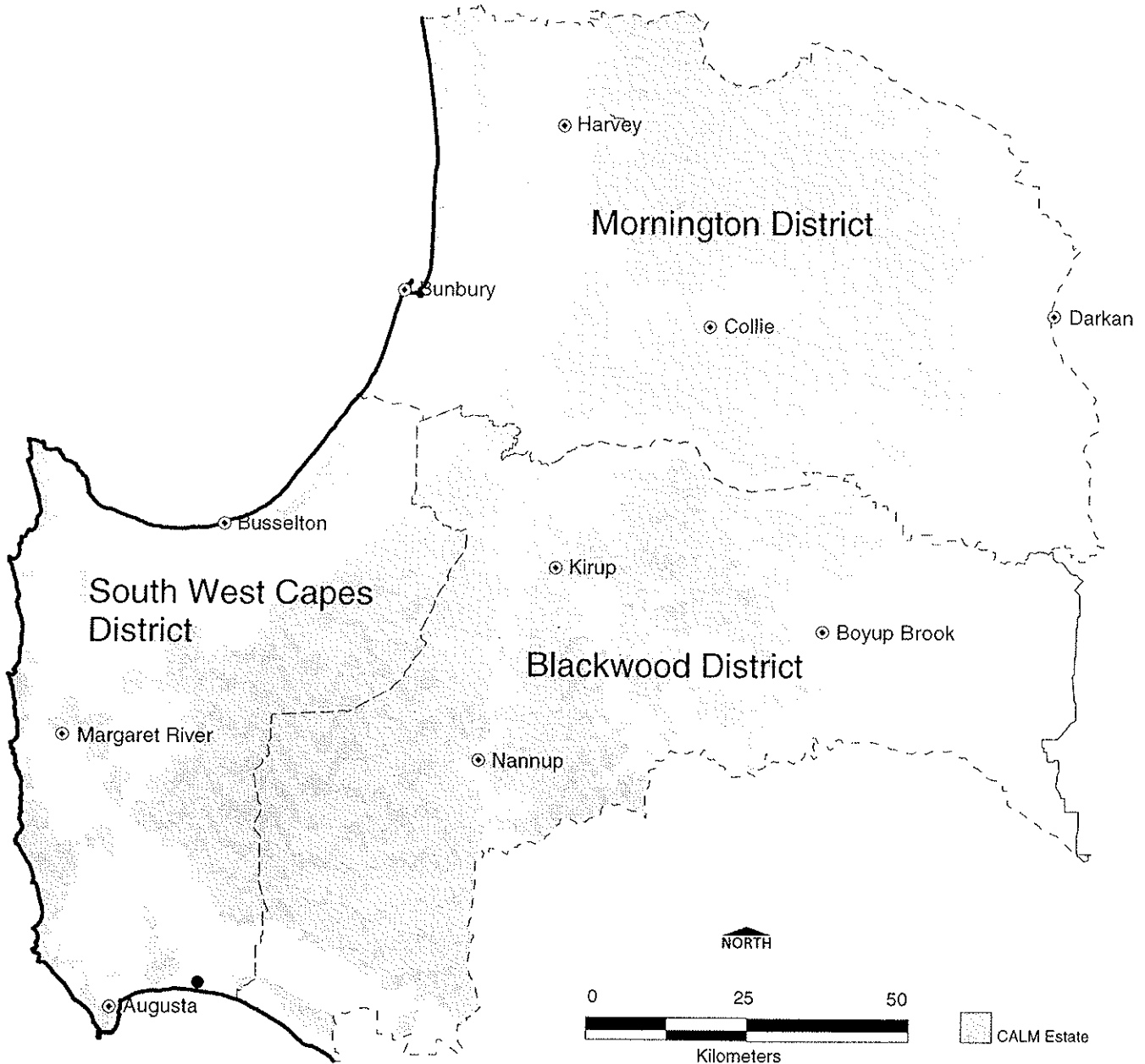
**Response to Disturbance**

**Susceptibility to *Phytophthora* Dieback**

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● **Leptomeria dielsiana**

## *Meziella trifida* (Nees) Schindl.

## HALORAGACEAE

*Meziella trifida* is a decumbent, semi-aquatic annual herb rooted at the nodes, which may become an erect, rooted perennial aquatic in situations of permanent inundation. Stems and leaves are mostly reddish, but larger plants in water may have green leaves. The leaves are alternate, subfleshy, narrow linear 3 - 5 mm at the stem base becoming 10 mm trifid toward the apex. The leaf lobes are generally equal in length with the acute tip possessing a hydathode (water secreting gland). The inflorescence is an indeterminate spike of flowers borne singly in the axils of the upper reduced bract-like leaves. Each sessile 4 merous flower is small (3 mm overall) composed of two 1 mm lanceolate to deltoid bracteoles subtending the 1.7 mm sepals which almost enclose the petals; all parts are red. There are four stamens and four styles. The ovary is 0.5 mm globular, developing short subulate processes. The sepals are persistent and elongate to form a terminal corona on the fruit. The mature fruit is a four locular pericarp 2.7 mm long and across.

**Flowering Period:** October to November

### **Distribution and Habitat**

*Meziella trifida* occurs on the slightly submerged flats present in Chester Block. Here the soils are grey sandy clays over clay, and slight depressions form in the soil. *M. trifida* can exist over summer as a small rootstock with short dense leafy stems of linear leaves. However, many plants in drier more exposed sites die during the late summer. Regrowth and germination occurs as the winter rains flood the small depressions and continues until the area begins to dry in October and November. Vegetation in which it is known consists of a low heath of *Pericalymma crassipes* over mixed sedges, chiefly *Leptocarpus* and *Restio* species. Scattered throughout are emergent *Melaleuca raphiophylla* and tall *Adenanthos detmoldii*.

### **Conservation Status**

Declared Rare Flora - Vulnerable

### **Known Populations**

| Population             | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Chester Forest Block | SWC      | AMR   | SF          | 20.11.96    | 100's         | good      |

### **Response to Disturbance**

Unknown

### **Susceptibility to *Phytophthora* Dieback**

Unknown

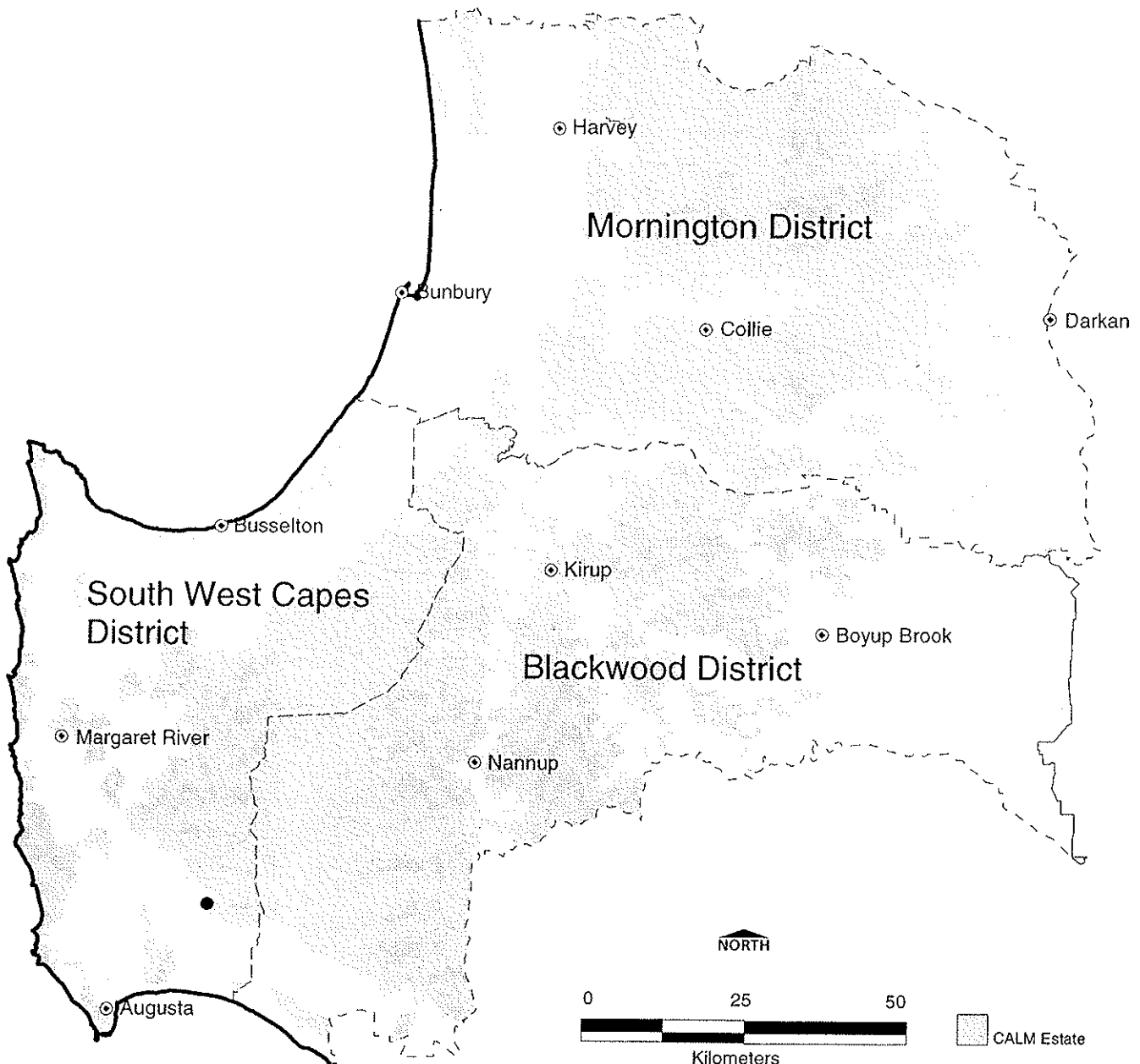
### **Management Requirements**

1. Search areas of suitable habitat nearby for new populations.
2. Monitor population periodically.

### **Research Requirements**

1. Assess *Phytophthora* susceptibility.

# Central Forest Region Threatened Flora Management Plan



● **Meziella trifida**

## *Petrophile latericola* Keighery ms

## PROTEACEAE

### Ironstone Pixie Mop

A slender erect few branched shrub to 2 m, 4 - 5 stems from a woody rootstock. Leaves are erect-spreading, pungent and 10 - 30 mm long. Inflorescences are terminal, small and usually in clusters of 2 - 4. The flowers are bright yellow.

It belongs to the *P. brevifolia* complex but is distinguished by its tall, slender habit, shorter leaves and small clustered flower heads, and by the absence of a lignotuber.

A new species first collected during the Swan Coastal Plain floristic survey.

**Flowering Period:** October and November

### Distribution and Habitat

*P. latericola* is confined to the Swan Coastal Plain, south-east of Busselton. Within this area it occurs in tall or low heath on winter-wet flats of red sandy clay over ironstone.

### Conservation Status

Declared Rare Flora – Critically Endangered

The Williamson population occurs on a sand mining lease. Exploration damage occurred in 1992. Dieback is suspected to have been introduced at this time.

### Known Populations

| Population   | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Williamson | SWC      | BSN   | SF          | 19.11.96    | 100+          | good      |
| 2 Ruabon     | SWC      | BSN   | Rail        | 27.6.97     | 3             | poor      |

### Response to Disturbance

Many plants at the Williamson location were apparently killed by 1991 fire. Prior to the fire 137 plants were recorded

### Susceptibility to *Phytophthora* Dieback

Field observations suggest it is highly susceptible to *Phytophthora*. Area sprayed twice with phosphite during 1997.

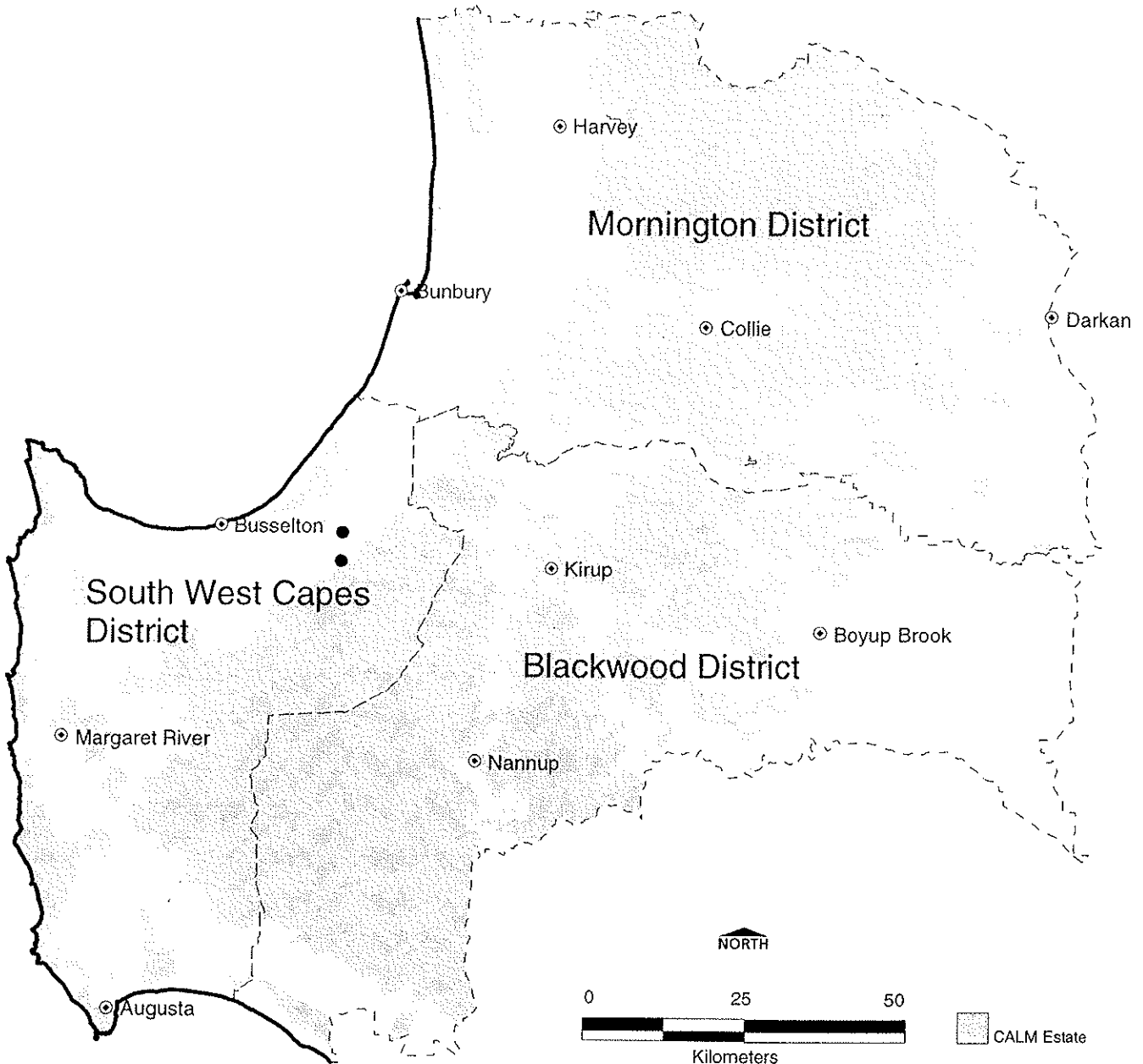
### Management Requirements

### Research Requirements

### References

Keighery, G. and Robinson, C. (1992) A survey of Declared Rare Flora and Other Plants in Need of Special Protection of the Scott Plains. Unpublished Report to the Australian National Parks and Wildlife Service, Department of Conservation and Land Management, Western Australia.

# Central Forest Region Threatened Flora Management Plan



● ***Petrophile latericola* ms**

## *Rulingia* sp. Trigwell Bridge (R Smith s.n. 20.6.89)

## STERCULIACEAE

*Rulingia* sp (Trigwell Bridge) is a small shrub/under shrub to 1.5m height and up to 1m width. Stellate hairs are visible. Stipules are deciduous, narrow, with the upper stipules often divided into slender lobes. Leaves entire. Terminal inflorescence of cymes. Flowers usually white. Petals shorter than or as long as the sepals, with a short broad base embracing the stamens and a linear or broad upper portion known as the ligule. Fruit is hairy. (adapted from Marchant *et al* 1987)

**Flowering Period:** September

### Distribution and Habitat

Known from only one remnant location in open jarrah/marri woodland, with *Xanthorrhoea preissii*, *Macrozamia riedleii*, *Banksia grandis*, *Sollya herophylla* and *Acacia pulchella*. Two translocation sites have been developed and are producing viable seed.

### Conservation Status

Declared Rare Flora – Critically Endangered

Extensive searches have failed to locate additional naturally occurring populations.

### Known Populations

| Population      | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Location 3271 | MON      | WEA   | PP          | 22.9.99     | 30?           | moderate  |
| 2 Haddleton     | MON      | WEA   | NR          | 22.9.99     | 180?          | good      |
| 3 Bennclaking   | MON      | WEA   | CP          | 22.9.99     | 12?           | good      |

### Response to Disturbance

Previous damage by rabbits and Twenty Eight Parrots has led to the erection of wire netting cages around the 3 plants. Seeding subsequently improved.

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

1. Maintain regular monitoring of population
2. Maintain protective fences
3. Undertake regular seed and germplasm collections
4. Continue liaison with land owner re: management of this species
5. Implement translocation program
6. Develop and implement a fire management plan

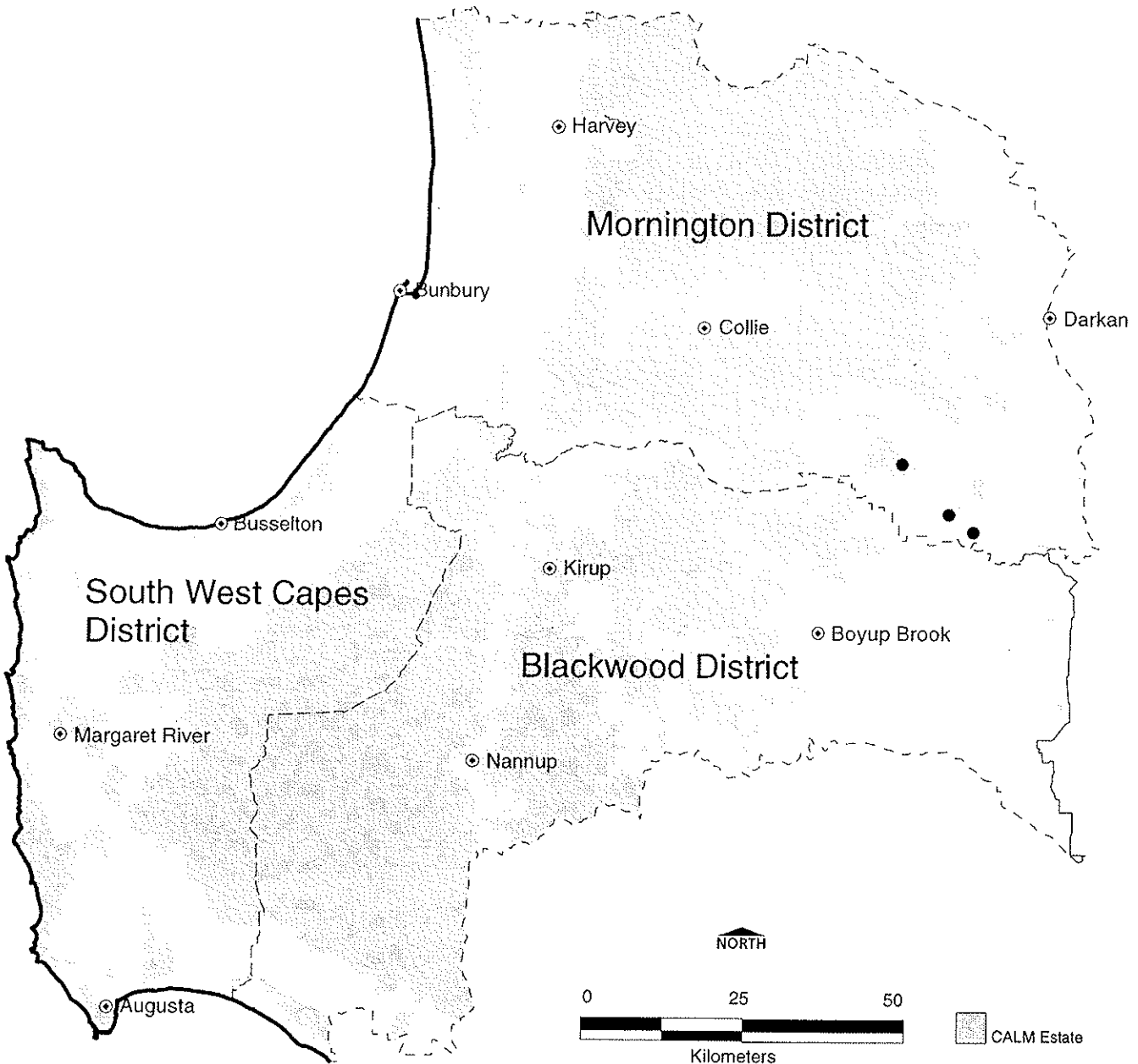
### Research Requirements

1. Investigate techniques to enhance *in-situ* propagation

### References

Stack, G., Evans, R. and English, V. (1999) Trigwell's *Rulingia* – *Rulingia* sp. Trigwell Bridge - Interim Recovery Plan No. 33, Department of Conservation and Land Management, unpublished report.

# Central Forest Region Threatened Flora Management Plan



● ***Rulingia sp. Trigwell Bridge* (R Smith s.n. 20/6/89)**



## *Tetragia australiensis* C.B. Clarke

## CYPERACEAE

A perennial herb with a woody rhizome and terete stems up to 1 m high. The leaves are cylindrical, to 18 cm long x 6 mm wide, with many fine, longitudinal lines. The basal leaves are numerous, becoming shorter further up the stem. The base of the leaf encloses the stem in a blackish-brown sheath. The inflorescence is slender, dull pinkish-brown, up to 30 cm long. Laterally flattened spikelets are densely clustered on numerous short, erect branches of the inflorescence. Each spikelet is about 1 cm long, containing two flowers and usually three empty basal glumes. The fruit is a smooth, round to elliptical nut.

This species had not been collected since 1901 and was presumed extinct until discovered at Mundijong in 1993. Its preference for flowering immediately after bushfires and in full summer probably reduces its chances of detection.

**Flowering Period:** December

### **Distribution and Habitat**

Known from Mundijong, Ruabon and Ambergate. Also recorded from Cannington and Serpentine River. It is now considered extinct in the metropolitan area. It occurs in grey sand over clay in Marri woodland, edging *Pericalymma ellipticum* heath. It favours swampy depressions or rises surrounding swamps.

### **Conservation Status**

Declared Rare Flora - Vulnerable

### **Known Populations**

| Population       | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Ruabon Reserve | SWC      | BSN   | NR          | 3.9.93      | 100           | good      |
| 2 Ambergate Res  | SWC      | BSN   | Shire       | 6.12.94     | 200           | good      |
| 3 SF12           | SWC      | CAP   | SF          |             | 100           | good      |

### **Response to Disturbance**

Flowers immediately after fire.

### **Susceptibility to *Phytophthora* Dieback**

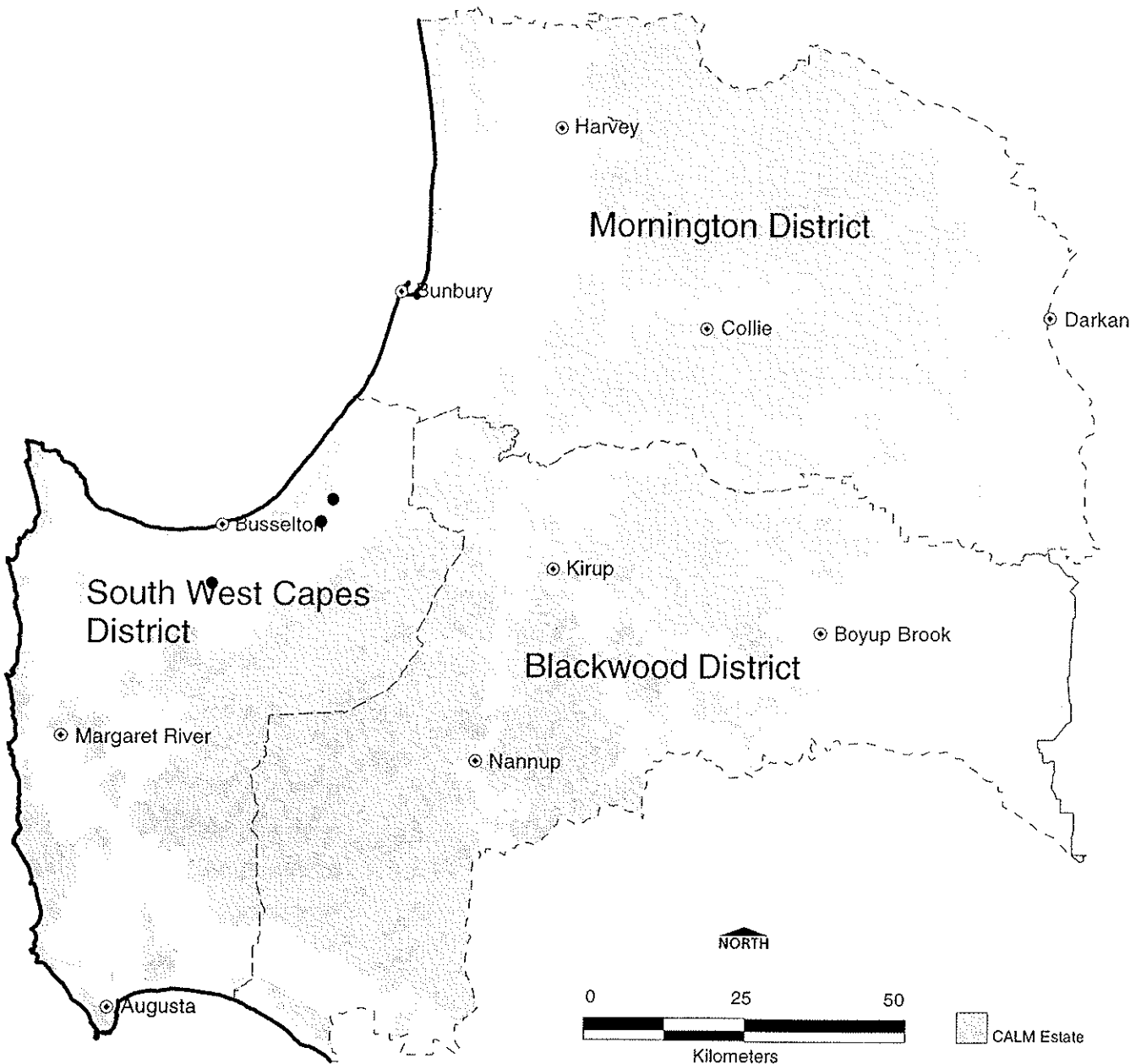
Unknown

### **Management Requirements**

1. Monitor and control weeds where required
2. Further survey
3. Review fire plan for Ruabon Reserve
4. Maintain liaison with Ambergate Committee regarding population monitoring.

### **Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● **Tetraria australiensis**

*Verticordia densiflora* Lindl. var. *pedunculata* A.S. George

MYRTACEAE

*Verticordia densiflora* var. *pedunculata* is a bushy shrub to 60cm tall. Leaves crowded onto short branchlets. The floral branchlets are corymbose and floral leaves are lanceolate, 1 - 1.5 mm wide. The flowers occur on stalks 5 - 9 mm long and are pink to white, and furry. The sepals are 3.8 - 4 mm long and the petals 1.6 - 2 mm long, almost circular and fringed. Style 5 - 6 mm long.

It is distinguished from the other varieties of *V. densiflora* by the longer flower stalks and larger flowers.

**Flowering Period:** December to January

**Distribution and Habitat**

*Verticordia densiflora* var. *pedunculata* is known from five populations within the Central Forest Region south and east of Busselton and another in the Southern Forest Region east of Manjimup. It occurs on flat, winter-wet sandy loam on road reserves which are largely cleared.

**Conservation Status**

Declared Rare Flora - Endangered

**Known Populations**

| Population           | District | Shire | Land Status | Last Survey | No. of Plants | Condition  |
|----------------------|----------|-------|-------------|-------------|---------------|------------|
| 1 Wonnerup Road      | SWC      | BSN   | Road        | 5.1.96      | 50+           | -          |
| 2 Capel NR           | SWC      | CAP   | NR          | 5.1.96      | 200           | restricted |
| 3 Wonnerup Road West | SWC      | BSN   | Road        | 5.1.96      | 36            | good       |
| 4 Edwards Road       | SWC      | BSN   | Road        | 5.1.96      | 100+          | good       |
| 5 Bell Road          | SWC      | CAP   | Road        | 5.1.96      | 35            | restricted |

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

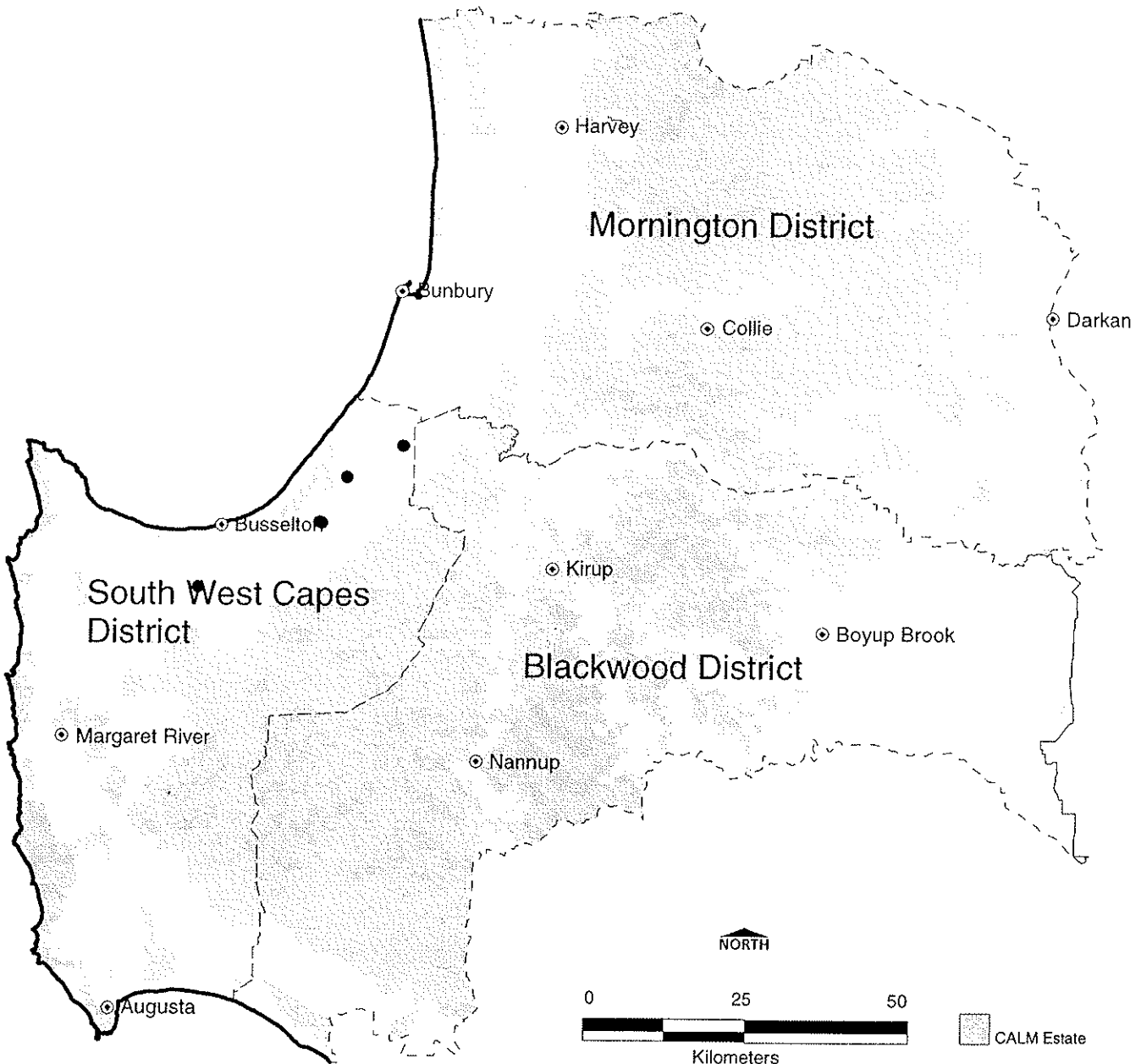
1. Survey Ruabon - Tutunup Rd to establish true extent of population
2. Investigate Kalgup location listed by A.S. George (Kalgup Road).

**Research Requirements**

**References**

George, A.S. (1991) New Taxa, combinations and typifications in *Verticordia* (Myrtaceae: Chamelaucieae). *Nuytsia* 7, 312-313.

# Central Forest Region Threatened Flora Management Plan



● *Verticordia densiflora var. pedunculata*

*Verticordia plumosa* (Desf.) Druce var. *ananeotes* A.S. George

MYRTACEAE

*Verticordia plumosa* var. *ananeotes* is a tufted shrub to 40 cm with small lignotuber and several to many simple or sparsely branched stems. Leaves are sparsely arranged on main stems but crowded on short axillary branchlets, 6 - 14 mm long x 0.7 mm wide. Flowers are in small groups with peduncles 4 - 7 mm long. They are deep mauve-pink fading to white. Sepals are 3 - 3.5 mm long.

*Verticordia plumosa* var. *ananeotes* is distinguished from *Verticordia plumosa* var. *plumosa* by a shorter stature (approximately 40 cm shorter) and the absence of glaucous colouration to its leaves.

**Flowering Period:** November to December

**Distribution and Habitat**

Recorded at Serpentine, "Murray District" (i.e. between Mundijong and Waroona), where it grows in open Jarrah woodland. It is common in Ambergate Reserve, near Busselton, growing on sandy soils in association with *Corymbia calophylla* (Marri), *Kingia*, *Xanthorrhoea*, *Stirlingia*, *Isopogon*, sedges, *Conostylis* ssp., *Melaleuca* spp., *Adenanthos* spp.

**Conservation Status**

Declared Rare Flora – Critically Endangered

**Known Populations**

| Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Ambergate Res NW | SWC      | BSN   | Shire       | 17.12.97    | 250+          | good      |
| 2 Ambergate Res SW | SWC      | BSN   | Shire       | 17.12.97    | 50            | moderate  |
| 3 Edwards Rd       | SWC      | BSN   | Road        | 3.12.96     | 4             | poor      |

**Response to Disturbance**

Health and flowering deteriorate without some regular burning. Thought to recover after fire from lignotuber and seed. Response to weeds unknown.

**Susceptibility to *Phytophthora* Dieback**

Unknown, but likely to be susceptible

**Management Requirements**

1. Maintain liaison with Ambergate Committee regarding population monitoring.
2. Monitor and control weeds especially population 3.
3. Maintain liaison with shire re: fire control
4. Other actions as identified in forthcoming IRP

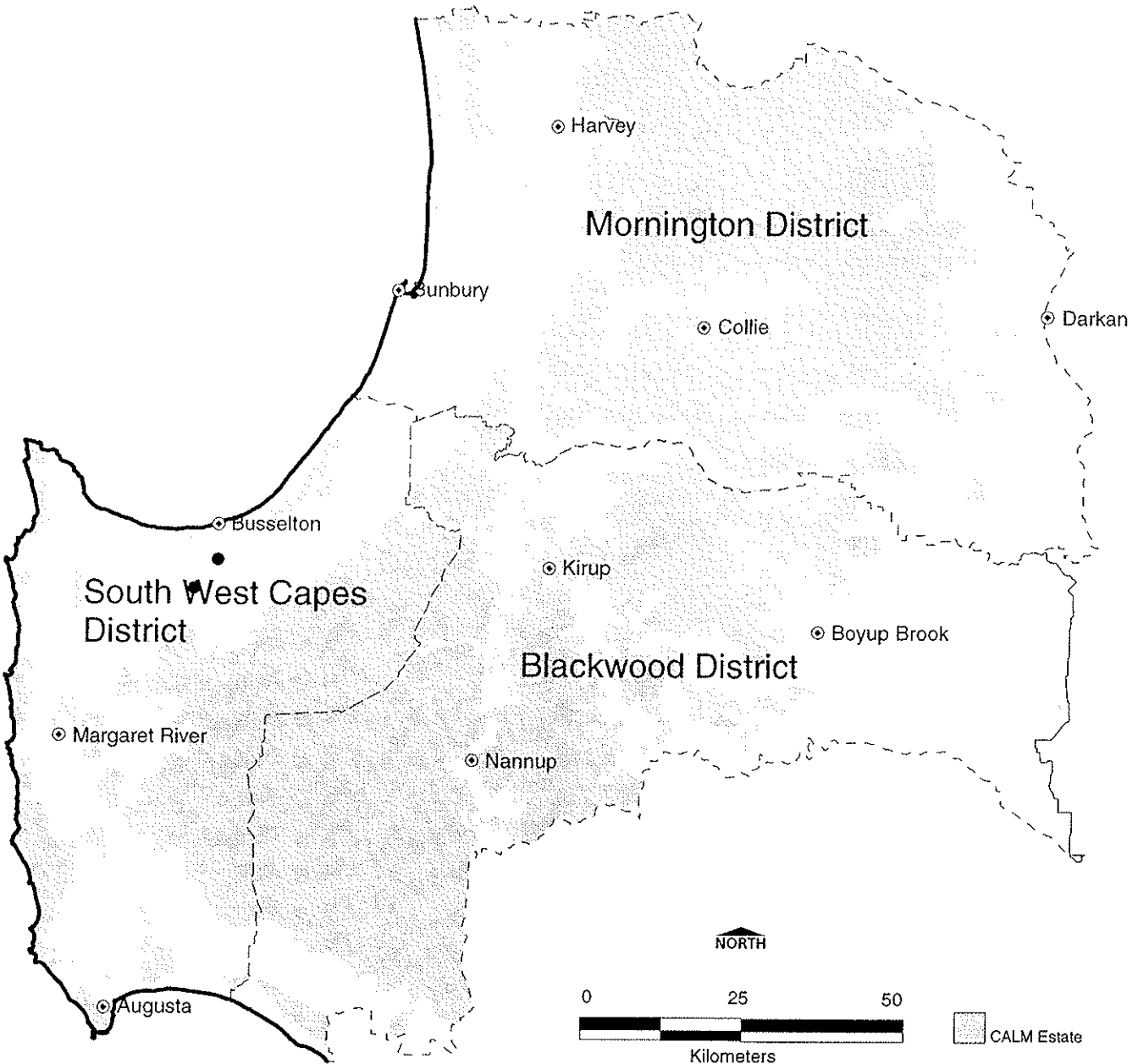
**Research Requirements**

1. As per forthcoming IRP

**References**

George, A.S. (1991) New Taxa, combinations and typifications in *Verticordia* (Myrtaceae: Chamelaucieae). *Nuytsia* 7, 231-394.

# Central Forest Region Threatened Flora Management Plan



● ***Verticordia plumosa* var. *ananeotes***

*Verticordia plumosa* (Desf.) Druce var. *vassensis* A.S. George

MYRTACEAE

*Verticordia plumosa* var. *vassensis* is an erect to spreading shrub up to 1 m tall and wide. Unlike some *Verticordia* species it is without a lignotuber. The branchlets usually arise from the main branches at 10 - 15 mm intervals. The leaves are slightly thickened and may be obtuse or almost acute, 3 - 7 mm long, 0.3 - 0.5 mm wide. The pink flowers occur on corymbose flowering branches. Flower stalks are 1.5 - 4 mm long. The hypanthium of the flower tube is 1.8 - 2 mm long and silky-hirsute. The sepals are 1.5 - 2.3 mm long with 4 - 6 main lobes that are broad, shortly plumose and erect towards the apex. The petals are 2 - 2.4 mm long. A band of hairs occurs below the stigma which is small.

It is distinguished from other varieties by the short peduncles (flower stalks) and small flowers. There are several collections, from Darking Swamp and Bowelling which are morphologically intermediate between *V. plumosa* var. *vassensis* and var. *brachyphylla*. Two other collections near Manjimup and Scott River are intermediate between var. *vassensis* and var. *plumosa*. This latter collection within the Central Forest Region has long peduncles (as in var. *plumosa*) but sepals only 2 mm long (as in var. *vassensis*).

**Flowering Period:** October to January

**Distribution and Habitat**

Known from Ambergate, between Ruabon and Tutunup, Scott River and south of Busselton. This species occurs in winter-wet flats and depressions, on a variety of sands and swampy clay soil within low heaths containing *Hypocalymma* sp., *Pericalymma elliptica*, *Isopogon formosus* and *Kingia australis*.

**Conservation Status**

Declared Rare Flora - Endangered

It appears that most if not all of the populations are vulnerable to some disturbances. The Busselton population is adjacent to drainage infrastructure and powerlines and has previously been disturbed. *Watsonia* sp. is encroaching from the drain banks - non-selective use of herbicide may pose a threat. The Scott River population has also suffered a reduction in numbers due to clearing. Current use of the firebreak adjacent to part of the Ruabon - Tutunup population for horse-riding may lead to the introduction of disease or weeds. Prescribed burning may pose a threat to several of the populations.

**Known Populations**

| Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Fish Rd          | SWC      | BSN   | Wat. Res    | 5.1.96      | 1000          | -         |
| 2a Acton Park Rd   | SWC      | BSN   | Shire       | 2.7.97      | 30            | poor      |
| 2b Acton Park Rd   | SWC      | BSN   | Shire       | 2.7.97      | 0             | poor      |
| 3 Kalgup Rd        | SWC      | BSN   | Shire       | 5.1.96      | 13            | -         |
| 4 Edwards Rd       | SWC      | BSN   | Shire       | 5.1.96      | 36            | -         |
| 5 Princefield Rd   | SWC      | BSN   | Shire       | 5.1.96      | 200           | mod       |
| 6 Ludlow-Htrgn Rd  | SWC      | BSN   | Shire       | 5.1.96      | 1             | poor      |
| 7a Tutanup Rd      | SWC      | BSN   | Shire       | 8.4.98      | 0             | mod       |
| 7b Tutanup Rd      | SWC      | BSN   | Rail        | 8.4.98      | 0             | mod       |
| 7c Tutanup Rd      | SWC      | BSN   | Shire       | 30.3.93     | 27            | -         |
| 7d Tutanup Rd      | SWC      | BSN   | Rail        | 30.3.93     | 27            | -         |
| 7g Ruabon Rd       | SWC      | BSN   | Shire       | 8.4.98      | 0             | poor      |
| 7h Ruabon Rd       | SWC      | BSN   | Rail        | 8.4.98      | 50+           | poor      |
| 7i Ruabon NR       | SWC      | BSN   | NR          | 30.4.93     | 1016          | -         |
| 8a Tutanup Rd      | SWC      | BSN   | Rail        | 30.3.93     | 78            | -         |
| 8b Tutanup Rd      | SWC      | BSN   | Shire       | 30.3.93     | 55            | -         |
| 8c Tutanup Rd      | SWC      | BSN   | Rail        | 30.3.93     | 54            | -         |
| 9 Ludlow-Htrgn Rd  | SWC      | BSN   | Shire       | 5.1.96      | 1             | poor      |
| 10a Gvnr-Broome Rd | SWC      | AMR   | Shire       | 24.11.93    | 900           | -         |
| 10b Gvnr-Broome Rd | SWC      | AMR   | Shire       | 24.11.93    | 1             | -         |
| 10c Gvnr-Broome Rd | SWC      | AMR   | Shire       | 24.11.93    | 1+            | -         |
| 10d Gvnr-Broome Rd | SWC      | AMR   | Shire       | 24.11.93    | 362           | -         |
| 10e Gvnr-Broome Rd | SWC      | AMR   | Shire       | 24.11.93    | 163           | -         |

### **Response to Disturbance**

Unknown

### **Susceptibility to *Phytophthora* Dieback**

Unknown, but likely to be susceptible

### **Management Requirements**

1. Regular monitoring
2. Monitor and control weeds where required, especially population 4
3. Liaison with shire and relevant community groups.

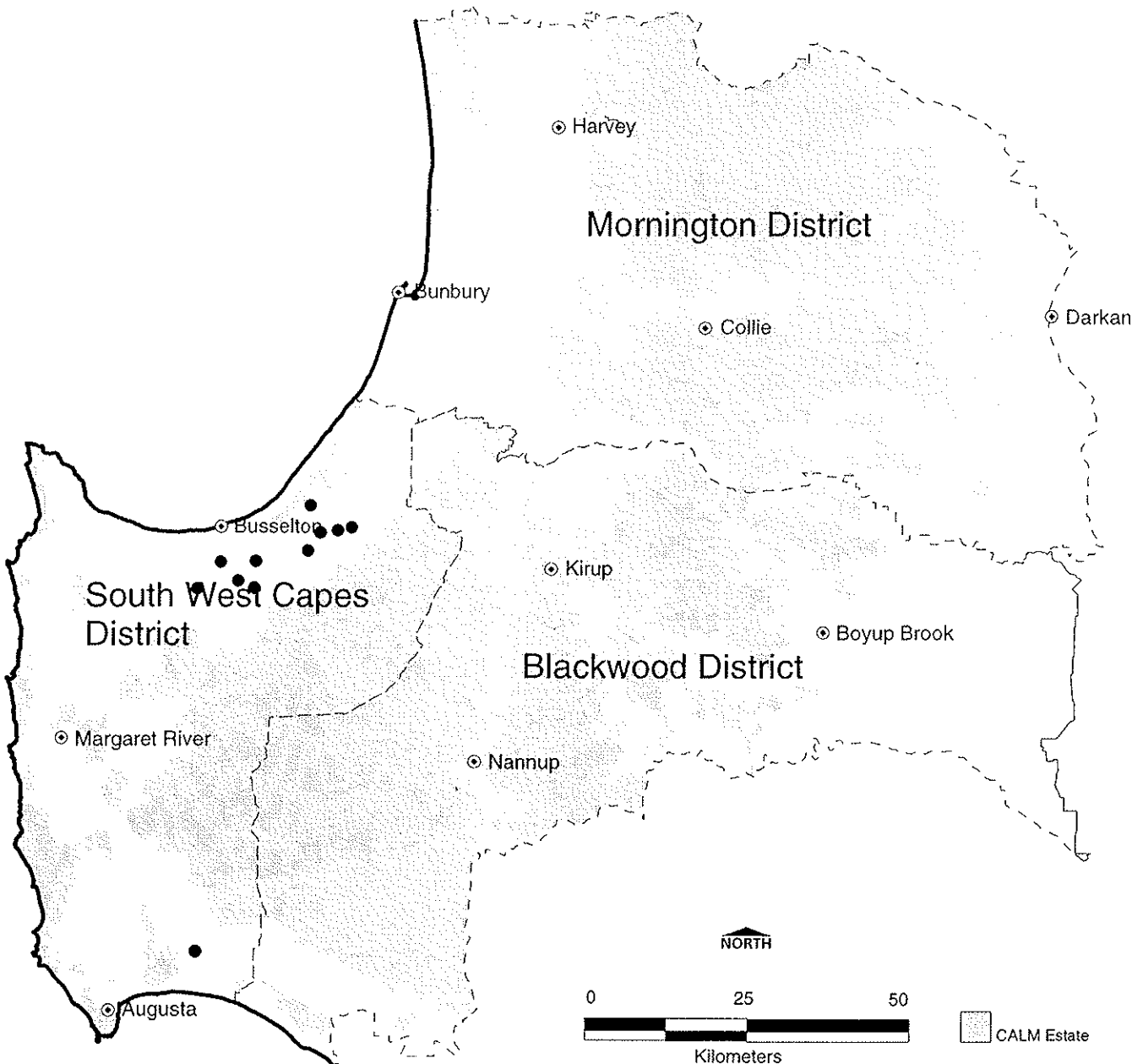
### **Research Requirements**

### **References**

George, A.S. (1991) New Taxa, combinations and typifications in *Verticordia* (Myrtaceae: Chamelaucieae). *Nuytsia* 7, 231-394.



# Central Forest Region Threatened Flora Management Plan



● *Verticordia plumosa var. vassensis*

## *Wurmbea calcicola* T. Macfarlane

## COLCHICACEAE

*Wurmbea calcicola* is a small bulbous herb which grows 8 - 18 cm tall. Of its 3 leaves, the lower 2 are basal and close together with the upper one slightly higher and separated by an exposed internode (not enclosed by leaf sheaths). The lower and middle leaves are ascending, 10 - 18 mm wide and glossy. The upper leaf is erect, exceeding the flowers, dilated and concave in the lower half and narrow and tapering in the upper half. The inflorescence is open, growing well beyond leaves and is erect, bearing two to five bisexual flowers. The perianth is 11 - 15.5 mm long with 6 narrow tepals. For a 1/4 of the perianth, the tepals form a well developed perianth tube and are white except for the nectary. Stamens are about half the length of tepals with anthers ca 1 mm long, oblong and purple. The styles are free.

*Wurmbea calcicola* is distinguished from variants of *Wurmbea centralis* by having white flowers (other than the nectaries) instead of pink and for having less separated nectaries and narrower tepals with a tube more than twice its length.

**Flowering Period:** June to July

### **Distribution and Habitat**

Known only from a very restricted area at Cape Naturaliste, Leeuwin-Naturaliste National Park, Western Australia. Occurs in small colonies in brown loam pockets on coastal limestone cliffs, in open or shaded places in low shrubland of *Melaleuca huegellii*, *M. acerosa*, *Spyridium globosum*, *Beyeria viscosa*, *Olearia axillaris*, *Guichenotia ledifolia*, *Templetonia retusa*, *Acacia* sp. and *Acanthocarpus preissii*.

### **Conservation Status**

Declared Rare Flora – Vulnerable

### **Known Populations**

| Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Cape Naturaliste | SWC      | BSN   | NP          | 6.11.96     | 400+          | good      |

### **Response to Disturbance**

Unknown. In the past the plants exhibited some insect grazing damage caused by an unidentified insect.

### **Susceptibility to *Phytophthora* Dieback**

Unknown

### **Management Requirements**

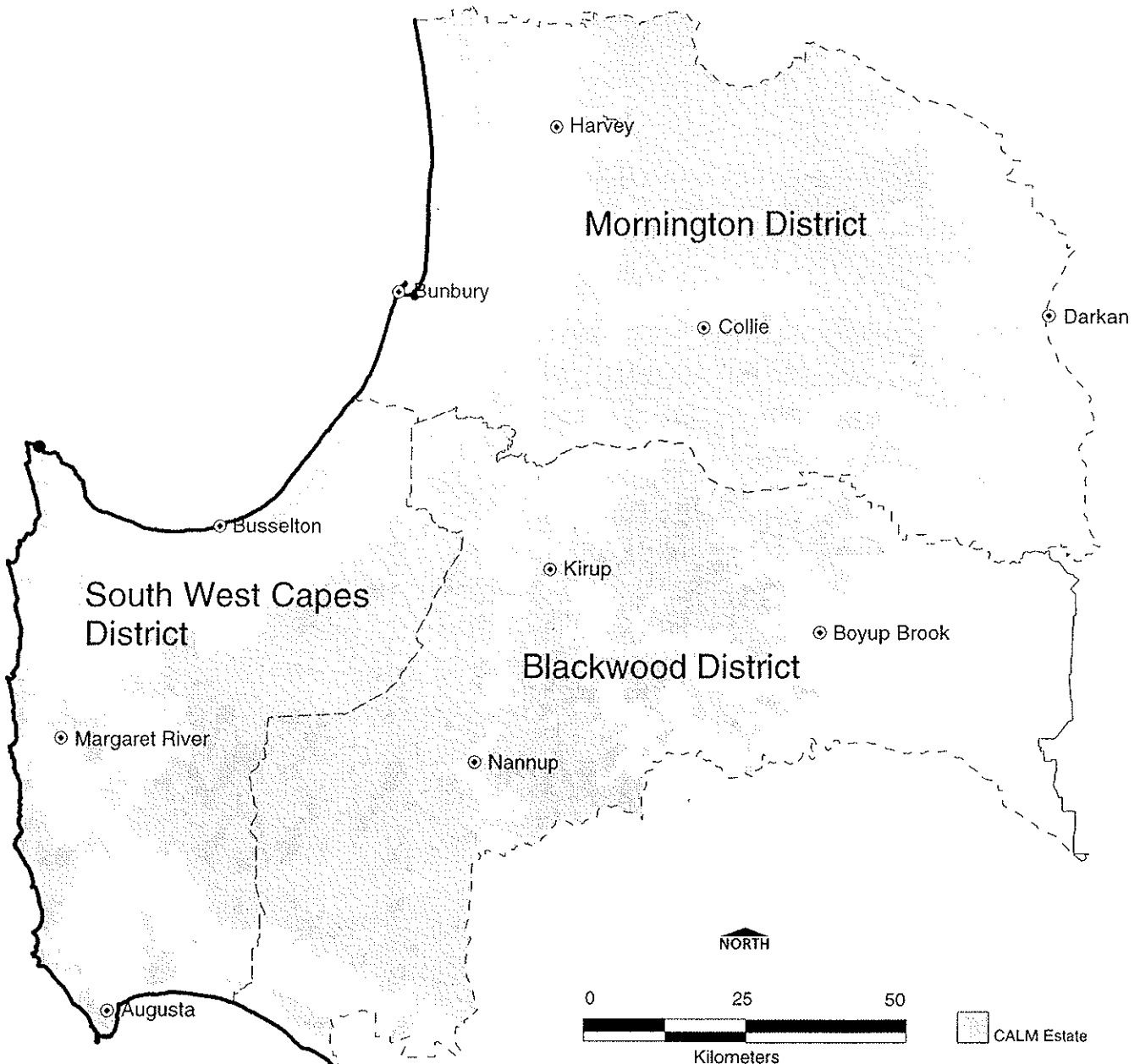
1. Further survey
2. Develop fire management strategy
3. Monitor the impact of recreation in the vicinity of the population.

### **Research Requirements**

### **References**

Macfarlane, T. (1993) *Wurmbea calcicola* (Colchicaceae), a new species from Cape Naturaliste, south west Western Australia. *Nuytsia* 9, 233-236.

# Central Forest Region Threatened Flora Management Plan



● **Wurmbea calcicola**

# PRIORITY ONE TAXA

*Andersonia ferricola* Lemson ms

Epacridaceae

*Andersonia ferricola* ms is a small shrub up to 50 cm in height and width. Branches are dense with spirally arranged twisting leaves with adnate sheathing bases. Inflorescence is terminal with non-scented pale lilac flowers.

**Flowering Period:** October

**Distribution and Habitat**

The species is located within the seasonally wet Busselton Ironstone areas of Tutunup and the base of the Whicher Range, predominantly in red-brown loam over ironstone. Associated species tend to be *Hakea* sp. Williamson, *Pericalymma ellipticum*, *Dryandra squarrosa* subsp. *argillacea*, *Dryandra nivea* subsp. *uliginosa*, *Dasypogon hookeri*, *Loxocarya magna*, and *Caustis dioica*.

**Conservation Status**

Priority 1

**Known Populations**

| Population        | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Ironstone Gully | SWC      | BSN   | SF          | 11.9.97     | 100+          | moderate  |
| 2 Smith Road      | SWC      | BSN   | SF          | 16.12.94    | 1000's        | good      |
| 3 Tutunup Road    | SWC      | BSN   | Shire       | 16.10.94    | -             | good      |
| 4 Gale/Jindong Rd | SWC      | BSN   | NR          | 11.6.97     | 100+          | good      |

**Response to Disturbance**

Unknown

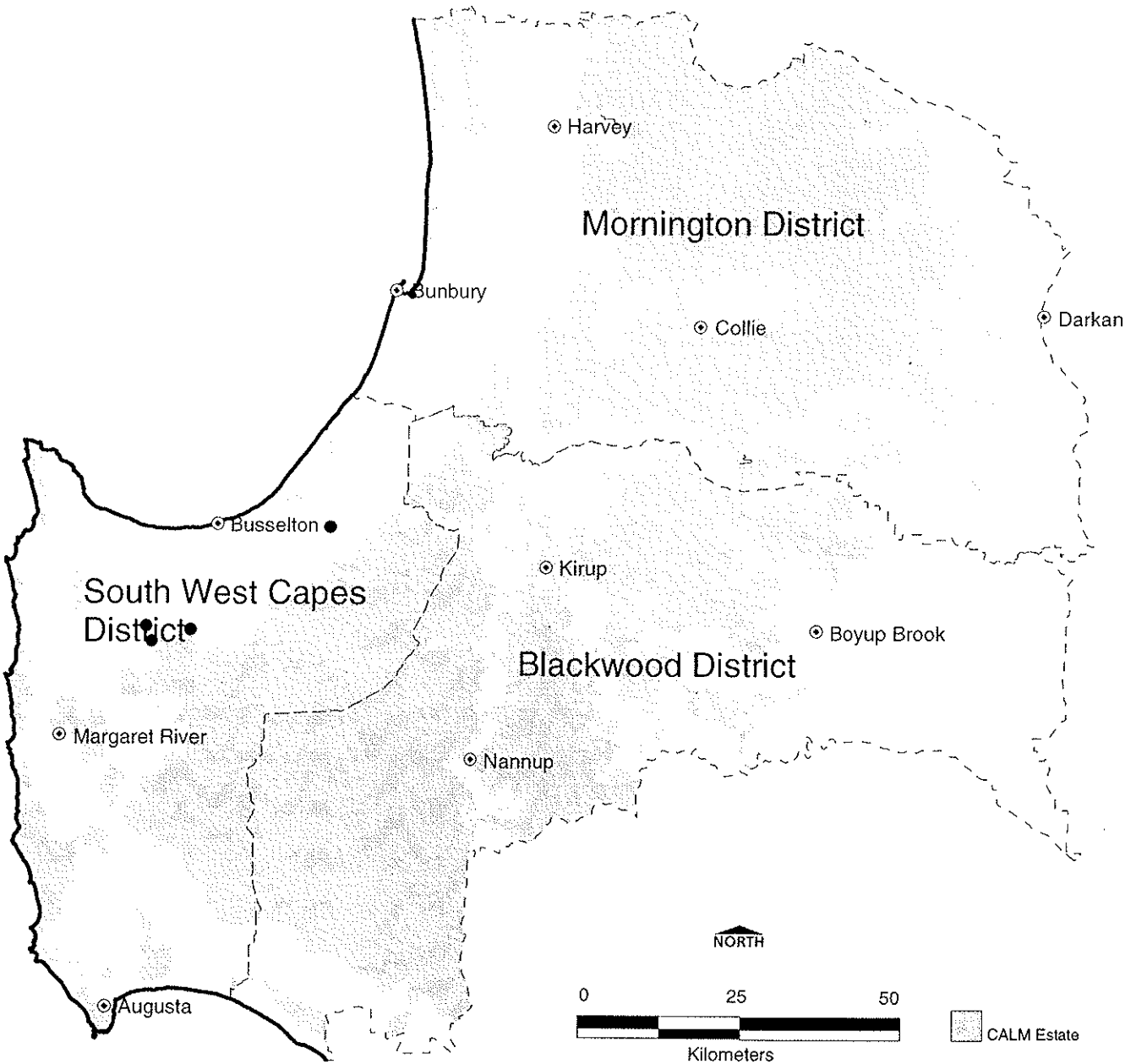
**Susceptibility to *Phytophthora* Dieback**

Susceptible

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● **Andersonia ferricola ms**

## *Boronia humifusa* Paul G. Wilson

RUTACEAE

Low-growing, wiry perennial herb, 0.1-0.2 m high. Flowers pink or red

**Flowering Period:** June or September.

### **Distribution and Habitat**

Jarrah Forest and Swan Coastal Plain. Soils: gravelly clay loam over laterite. Habitat: jarrah-marri open forest.

### **Conservation Status**

Priority 1

### **Known Populations**

| Population            | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Capel/Donnybrook Rd | SWC      | CAP   | Shire       | 18.10.96    | 3             |           |
| 2 Capel/Donnybrook Rd | SWC      | CAP   | Shire       | 18.9.96     | common        |           |
| 3a – 3d Camp Gully Rd | BWD      | DBK   | SF          | 15.10.98    | frequent      |           |

### **Response to Disturbance**

Responds to physical disturbance.

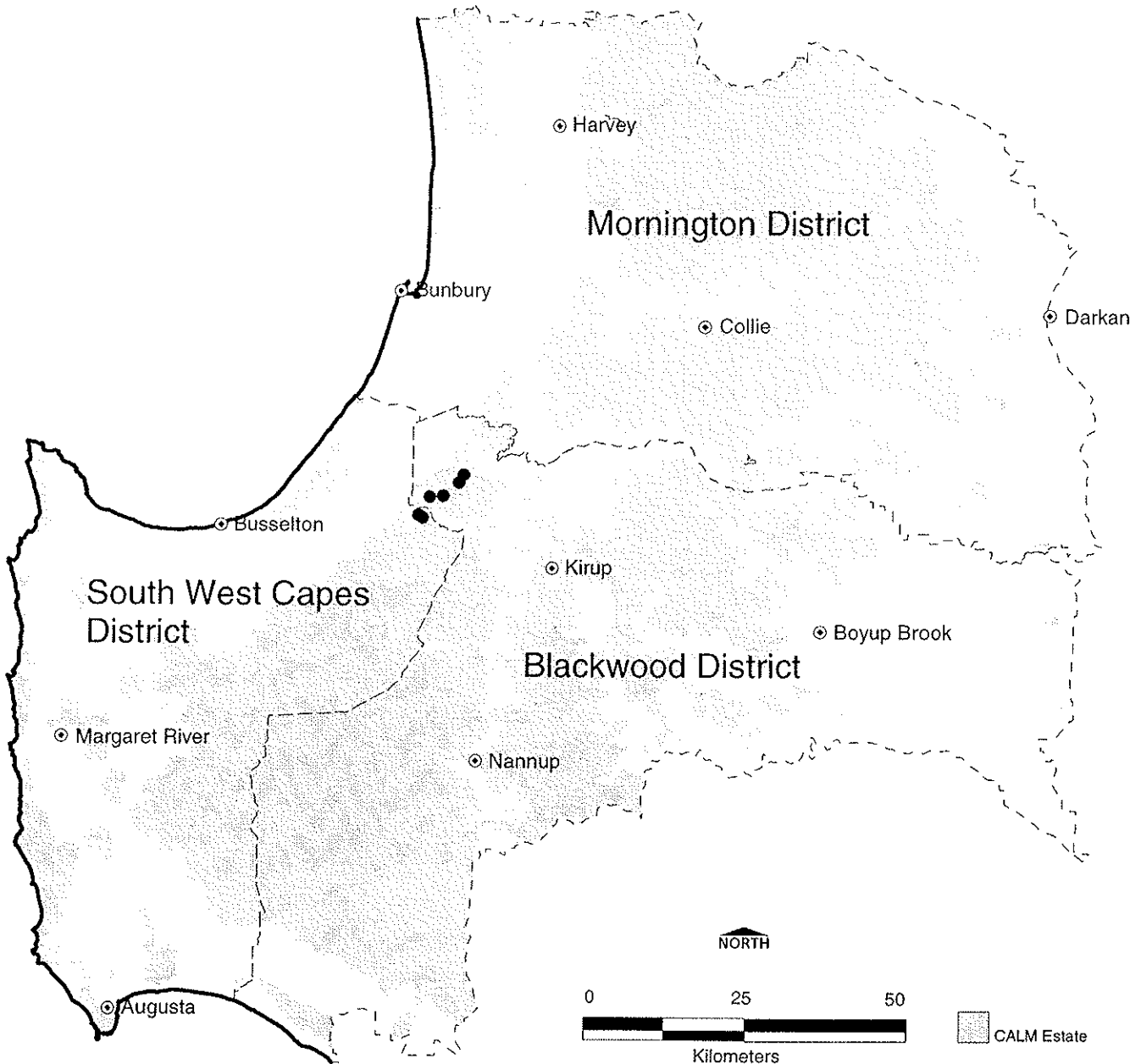
### **Susceptibility to *Phytophthora* Dieback**

Unknown

### **Management Requirements**

### **Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● **Boronia humifusa**



## ***Boronia juncea* Bartl. subsp. *juncea***

RUTACEAE

Slender or straggly shrub. Flowers pink. Pedicels ca. 3 mm long, glabrous. Sepals glabrous, narrowly triangular with subulate – acuminate apex, ca. 2.5 mm long. Petals obovate, acuminate, ca. 4 mm long, glabrous.

**Flowering Period:** April

### **Distribution and Habitat**

Only one population known from about 27 km north of Bunbury. Inhabits sandy soils in low scrub on the Swan Coastal Plain.

### **Conservation Status**

Priority 1

### **Known Populations**

|   | Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---|------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 | Gwalia     | MON      | HVY   | PP          | 20.4.93     |               |           |

### **Response to Disturbance**

Unknown

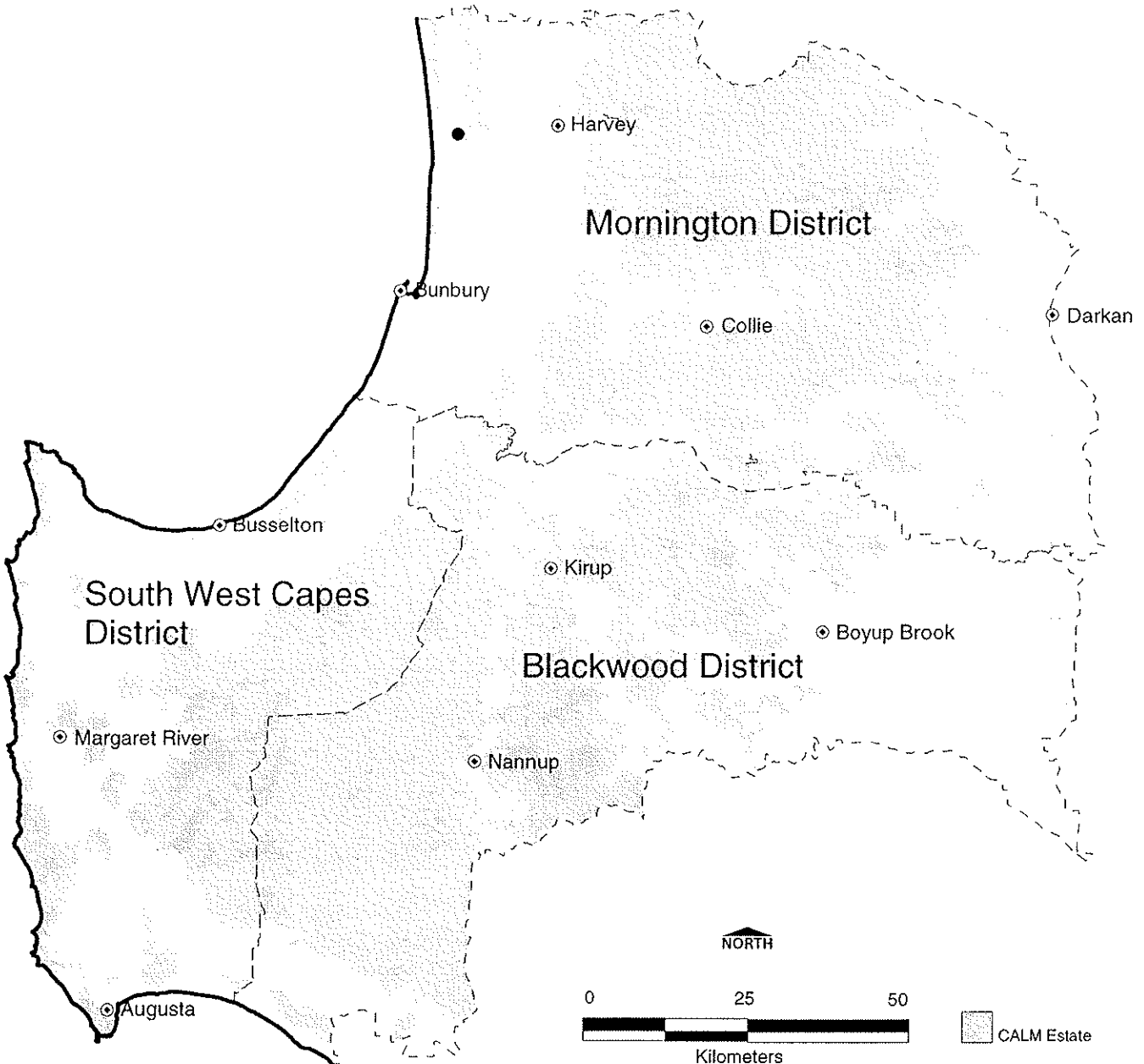
### **Susceptibility to *Phytophthora* Dieback**

Unknown

### **Management Requirements**

### **Research Requirements**

# Central Forest Region Threatened Flora Management Plan



- **Boronia juncea subsp. juncea**

*Caladenia longicauda* Lindl. subsp. *clivicola* Hopper & A.P. Brown ms

ORCHIDACEAE

Hill's White Spider Orchid

This orchid grows to 30 - 50 cm tall and has a relatively small labellum compared to the size of the sepals and petals. The sepals and petals are splayed horizontally near the base and become stiffly vertical. They are pale greenish yellow to cream, with distinctive maroon stripes beneath. The lateral sepals are 7 - 14 cm long and the labellum is 15 - 25 mm long x 7 - 13 mm wide, with relatively slender fringe segments to 2.5 mm long. Calli are small (to 2 mm long) and are usually arranged in neat rows.

*Caladenia longicauda* subsp. *clivicola* is one of eleven subspecies of *C. longicauda*. It is distinguished from the other ten subspecies by the greenish yellow tinged flowers and small, narrow labellum with slender fringe segments and small calli.

**Flowering Period:** September to October

**Distribution and Habitat**

Confined to the southern Darling Scarp between Dandalup and Collie, with a more southern population near Dunsborough. It appears to grow isolated from the other *C. longicauda* subspecies, in moist marri-jarrah forest or adjacent to bullich woodland, often near outcropping granite. The Dunsborough population grows on coastal granitic slopes in low heath of *Hakea trifurcata*, *Daviesia horrida*, *Dodonaea ceratocarpa* and *Pimelea ferruginea*.

**Conservation Status**

Priority I

**Known Populations**

| Population              | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-------------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Blackboy Picnic area  | MON      | HVY   | SF          | 25.9.87     | abundant      | -         |
| 2 Loc 6229 Cape Nat Dve | SWC      | BSN   | Shire       | 16.9.97     | 0             | good      |
| 3 Cape Nat drive        | SWC      | BSN   | Shire       | 16.9.97     | 10            | good      |
| 4 Bunkers Bay           | SWC      | BSN   | Shire       | 16.9.97     | 3             | good      |
| 5 Western Boundary Rd   | MON      | HVY   | -           | 25.9.87     | -             | -         |
| 6 Loc. 1305             | SWC      | BSN   | PP          | 17.9.97     | 15            | good      |
| 7 Dardanup              | BWD      | DAR   | NR          | 9.9.95      | -             | -         |

**Response to Disturbance**

Abundant after fire.

**Susceptibility to *Phytophthora* Dieback**

Unknown, however there is no evidence that *Caladenia* species are susceptible.

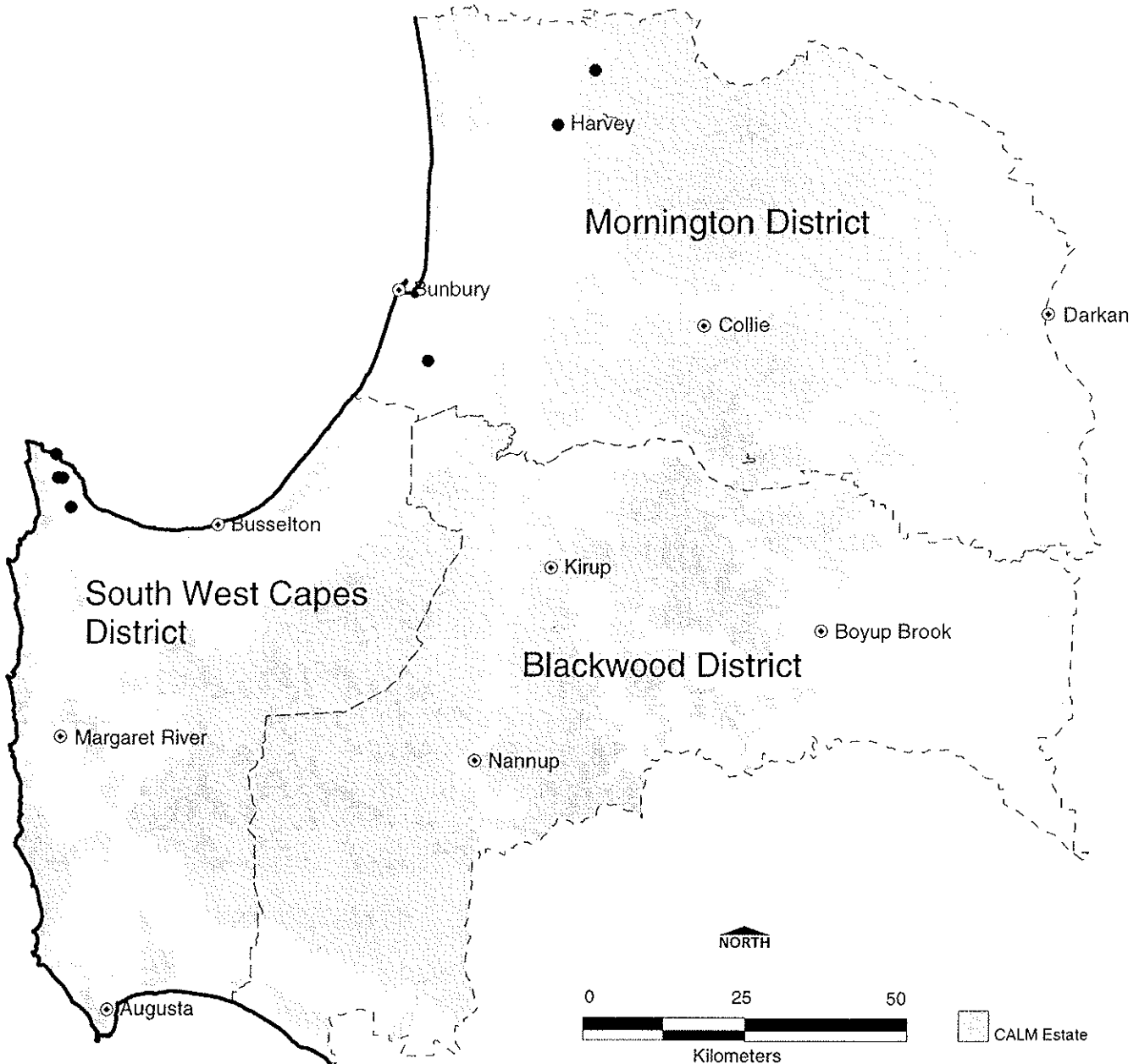
**Management Requirements**

**Research Requirements**

**References**

Hoffman, N. and Brown, A. (1998) *Orchids of South-west Australia*. Revised 2<sup>nd</sup> edition with supplement. University of Western Australia Press, Nedlands.

# Central Forest Region Threatened Flora Management Plan



● *Caladenia longicauda* subsp. *clivicola* ms

*Caladenia uliginosa* A.S. George subsp. *patulens* Hopper & A.P. Brown ms

ORCHIDACEAE

Frail Spider Orchid

First collected near Harvey by S.D. Hopper in 1984, *C. uliginosa* subsp. *patulens* is a small tuberous orchid 20 - 35 cm high with a single hairy leaf and 1 - 3, pale green and white spider-like flowers 4 - 6 cm across. The labellum is 15 - 20 mm long and 8 - 11 mm wide, with a fringe of pale maroon segments is to 4 mm long with enlarged white-tipped apices. Its dorsal sepal is erect, 4.5 - 9 cm long x 2 - 2.5 mm wide, and it has lateral sepals 4.5 - 8 cm long x 4 - 5 mm wide and petals (4 - 8 cm long x 2 - 3 mm wide) splayed horizontally or slightly ascending before curving downwards.

There are three subspecies of *C. uliginosa*, with *C. uliginosa* subsp. *patulens* differing notably from the other two in its stiffer, more spreading petals and lateral sepals and its occurrence in well-drained soils in jarrah-marri forest. It lacks the red labellum apex seen in *C. uliginosa* subsp. *uliginosa*, and has longer petals and sepals than *C. uliginosa* subsp. *candicans*. It also tends to grow as rare scattered individuals rather than in colonies.

**Flowering Period:** Late September to October

**Distribution and Habitat**

Known from three small populations near Harvey and Nannup. In both locations it grows amongst dense shrubs in jarrah-marri forest in clay-loam soil.

**Conservation Status**

Priority 1

A rare subspecies of very restricted occurrence and regarded as poorly known and in urgent need of further survey (Hopper *et al*, 1991).

**Known Populations**

| Population        | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Harvey          | MON      | HVY   | -           | 25.9.87     | <3            | -         |
| 2 Old Cundinup Rd | BWD      | NAN   | SF          | 13.10.88    | 26            | -         |
| 3 Honeymoon Rd    | MON      | HVY   | -           | 21.9.84     | common        | -         |

**Response to Disturbance**

The plants may be killed by inappropriate fire (May-November), but appear to flower well in the Spring following summer fire (December-April).

**Susceptibility to *Phytophthora* Dieback**

Unknown, however there is no evidence that *Caladenia* species are susceptible.

**Management Requirements**

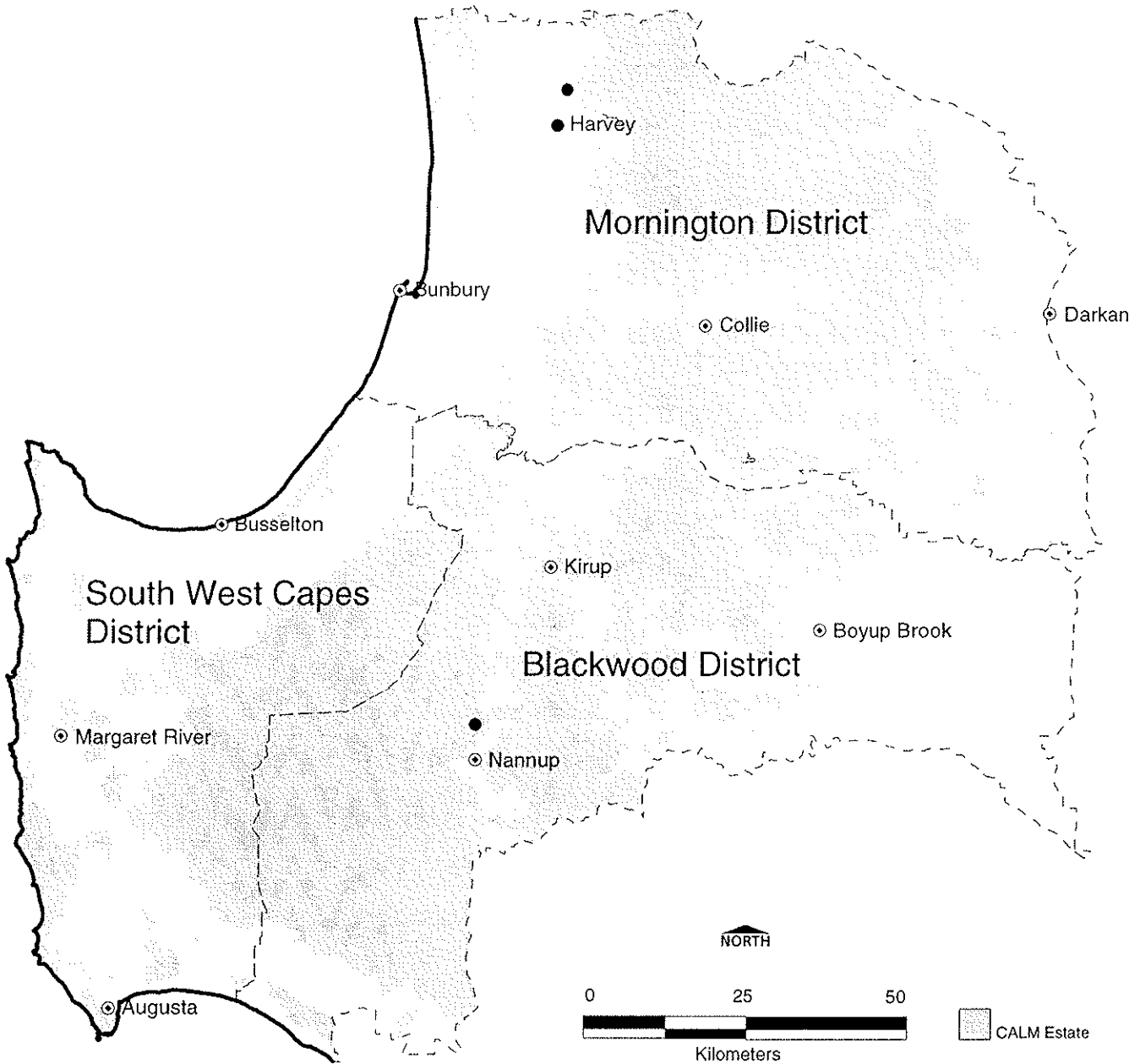
1. Further survey
2. Monitor and control weeds where necessary

**Research Requirements**

**References**

Hoffman, N. and Brown, A. (1998) *Orchids of South-west Australia*. Revised 2<sup>nd</sup> edition with supplement. University of Western Australia Press, Nedlands.

# Central Forest Region Threatened Flora Management Plan



● *Caladenia uliginosa* subsp. *patulens* ms

## *Calothamnus* sp. Whicher (B.J Keighery & N.Gibson 230)

Myrtaceae

*Calothamnus* sp. Whicher (closely related to *Calothamnus quadrifidus*) is an erect shrub 1 – 2 m high, multi-stemmed at base. Leaves are densely crowded, spreading and terete. Inflorescence usually a dense 1-sided spike, flowers 4-merous, floral tube 3 – 4 mm long and glabrous. Stamen bundles red with filaments usually 12 - 20. Capsule usually 7 – 9 mm long, broadest at centre, smooth, with 2 prominent terminal sepals.

**Flowering Period:** August to October

### **Distribution and Habitat**

Species is found predominantly around the Tutunup-Oates Road areas and along the base of the Whicher Scarp. It appears to be associated with areas of deeper red-brown loam over ironstone. Roadside remnant vegetation houses many of the species populations.

### **Conservation Status**

Priority 1

### **Known Populations**

| Population          | District | Shire | Land Status  | Last Survey | No. of Plants | Condition |
|---------------------|----------|-------|--------------|-------------|---------------|-----------|
| 1a Smith Road       | SWC      | BSN   | SF           | 20.2.97     | 50            | good      |
| 1b Loc 2699         | SWC      | BSN   | PP           | 4.7.97      | -             | moderate  |
| 2a Tutunup Rd       | SWC      | BSN   | Shire        | 12.6.97     | 100's         | good      |
| 2b Tutunup Rd       | SWC      | BSN   | Rail         | 12.6.97     | 1000's        | good      |
| 3 Williamson Rd     | SWC      | BSN   | SF           | 29.8.97     | 100+          | good      |
| 4 Princefield Rd    | SWC      | BSN   | Shire, Water | 29.8.97     | 100+          | good      |
| 5 Oates Rd. (west)  | SWC      | BSN   | Shire        | 21.11.97    | 30            | good      |
| 9 Loc 3203          | SWC      | BSN   | PP           | 2.1.98      | 1000's        | moderate  |
| 10 Tompsett Rd      | SWC      | BSN   | Water        | 2.1.98      | 30            | good      |
| 11 Loc 1784         | SWC      | BSN   | Shire        | 1.5.97      | 15            | good      |
| 13 Butcher Rd       | SWC      | BSN   | Shire        | 2.1.98      | 70            | good      |
| 14 Wilcocks pltn    | SWC      | BSN   | SF           | 21.11.97    | 30            | good      |
| 15a Yoongarillup Rd | SWC      | BSN   | Shire        | 30.6.97     | 50+           | good      |
| 15b Yoongarillup Rd | SWC      | BSN   | Water        | 30.6.97     | 50+           | good      |
| 16 Doyle Rd         | SWC      | BSN   | Shire        | 24.6.97     | 30+           | good      |
| 17 Harper Rd        | SWC      | BSN   | Shire        | 24.6.97     | 100+          | moderate  |
| 18 Adams Rd         | SWC      | BSN   | Shire        | 24.6.97     | 50+           | good      |

### **Response to Disturbance**

Unknown

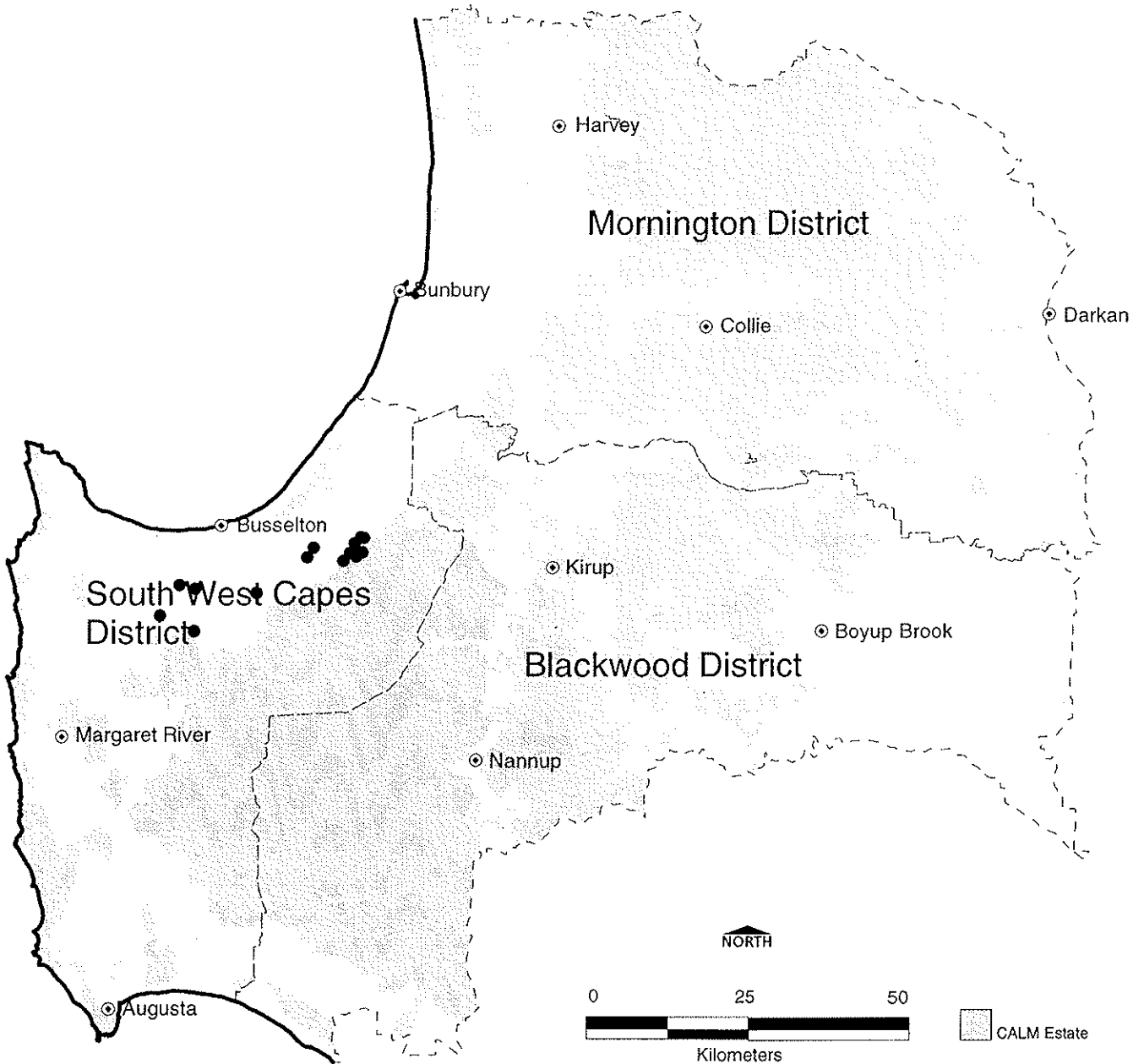
### **Susceptibility to *Phytophthora* Dieback**

Unknown, but field observations suggest it is resistant.

### **Management Requirements**

### **Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● **Calothamnus sp. Whicher (BJ Keighery & N Gibson 230)**



*Carex tereticaulis* F. Muell.

CYPERACEAE

Monoecious rhizomatous, tufted perennial, grass-like sedge to 0.7 m high. Flowers brown.

**Flowering Period:** September to October

**Distribution and Habitat**

Inhabits black peaty sands on the Swan Coastal Plain and white sands in the Jarrah Forest.

**Conservation Status**

Priority 1

**Known Populations**

| Population   | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Bridgetown | BWD      | BRG   | VCL         | 20.2.96     | -             | -         |
| 2 Winnejup   | BWD      | BOY   | Shire       | 25.11.96    | -             | -         |
| 3 Dardanup   | MON      | DAR   | Shire       | 17.11.80    | -             | -         |
| 4 Harvey     | MON      | HVY   | ?           | 13.09.49    | -             | -         |

**Response to Disturbance**

Unknown

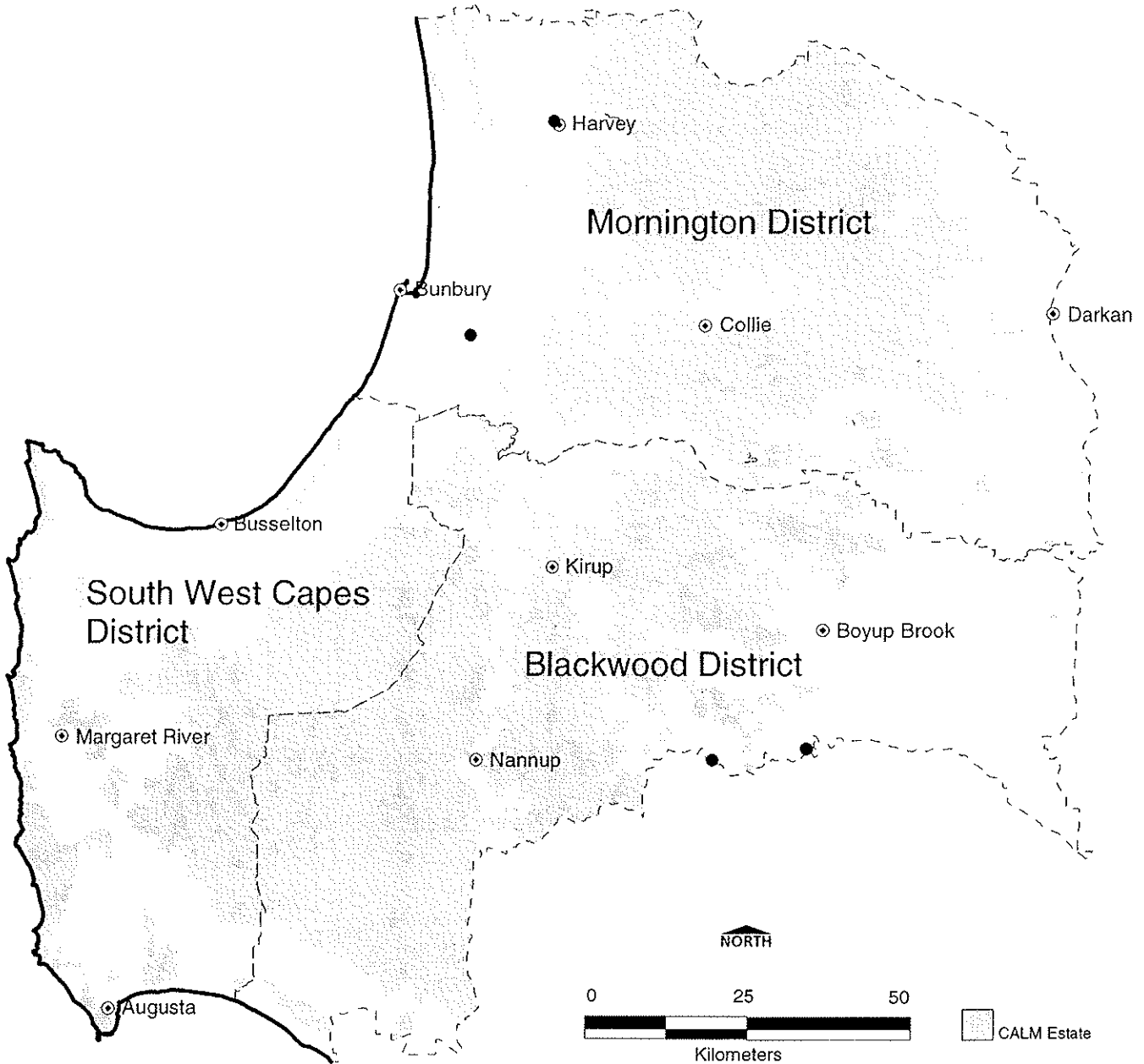
**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● **Carex tereticaulis**

*Caustis* sp. Boyanup (G.S. McCutcheon 1706)

CYPERACEAE

**Flowering Period:**

**Distribution and Habitat**

This species is reported from several sites at Boyanup and the Whicher Range in grey sand within low woodlands of Jarrah, Banksia and Marri over mixed shrub and heath.

**Conservation Status**

Priority 1

The Boyanup State Forest population, apparently the largest, occurs within a mineral sands mining lease. The Whicher Range populations occur within a Proposed Nature Reserve.

**Known Populations**

| Population                      | District | Shire | Land Status | Last Survey | No. of Plants | Condition   |
|---------------------------------|----------|-------|-------------|-------------|---------------|-------------|
| 1 Whicher                       | SWC      | BSN   | Prop NR     | 5.10.93     | 39            | undisturbed |
| 2 Boyanup Block<br>Location 389 | MON      | CAP   | SF          | 5.10.93     | 200           | undisturbed |
| 3 Reserve 2052                  | BWD      | DBK   | Shire       | 2.9.97      | 100+          | good        |
| 4 NE of "Old Kemp Rd"           | SWC      | BSN   | NR          | 25.9.92     | common        | undisturbed |

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

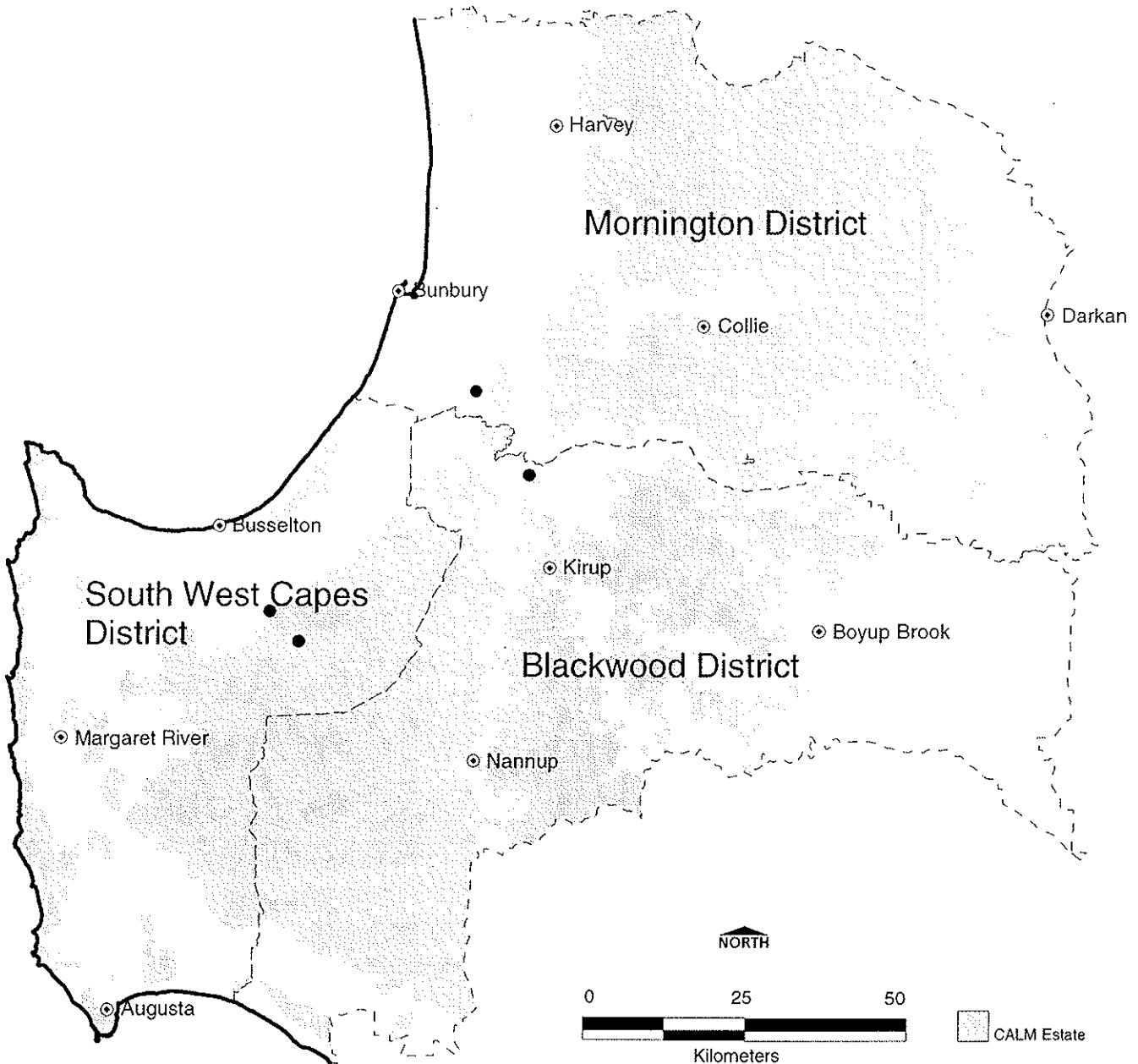
Unknown

**Management Requirements**

Liaison with relevant mining personnel to alert them of the population has occurred. Continued contact in case a change in mining status occurs.

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● ***Caustis sp. Boyanup* (G.S. McCutcheon 1706)**

*Chordifex jacksonii* L.A.S. Johnson & B.G. Briggs ms

RESTIONACEAE

Rhizomatous, erect perennial herb (sedge) 0.4 to 1 m high.

**Flowering Period:**

**Distribution and Habitat**

On sands or loamy sands in swamps and seasonally wet flats from the Scott Plain to Albany.

**Conservation Status**

Priority 1

**Known Populations**

|   | Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 8 | Black Point Rd (A) | BWD      | NAN   | SF          | 10.8.95     | common        | good      |
| 9 | Black Point Rd (B) | BWD      | NAN   | SF          | 10.8.95     | occasional    | good      |

**Response to Disturbance**

Unknown

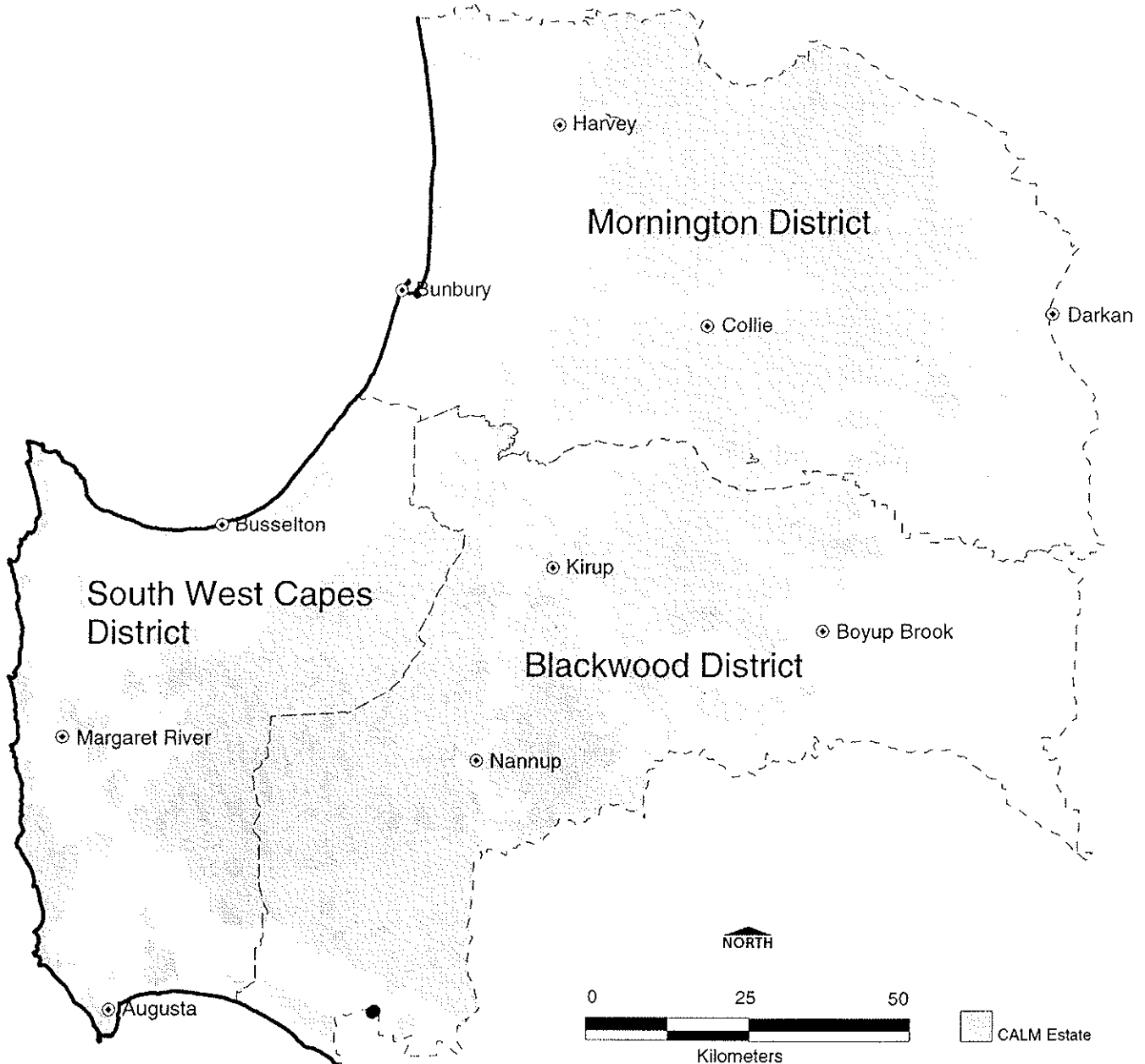
**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● *Chordifex jacksonii ms*

*Conospermum caeruleum* R.Br. subsp. *contortum* E.M. Benn.

PROTEACEAE

*Conospermum caeruleum* subsp. *contortum* is a shrub from 0.5 to 1 m, with leaves mostly basal with long petioles and a loose panicle with sparse clusters of (?)woolly blue flowers. It can be readily distinguished from subsp. *caeruleum*, with which it has an overlapping distribution, by the twisting of its leaves.

**Flowering Period:** Unknown, *C. caeruleum* subsp. *caeruleum* flowers from August to October.

**Distribution and Habitat**

It is known only from the type specimen, collected west of Nannup in 1948.

**Conservation Status**

Priority I

**Known Populations**

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| I Nannup   | BWD      | NAN   | -           | 15.10.48    | -             | -         |

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

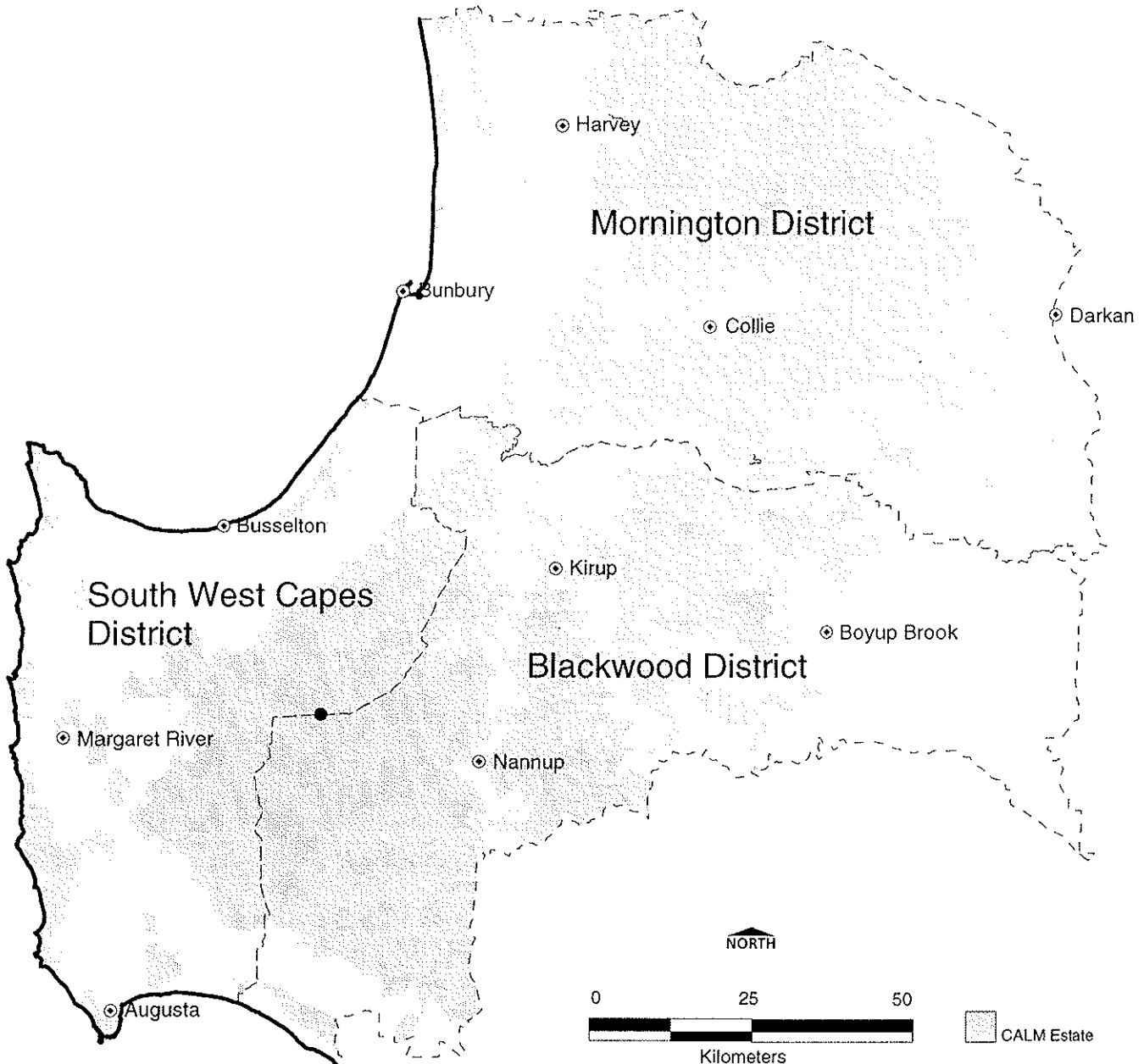
Unknown

**Management Requirements**

1. Survey of type specimen location

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● ***Conospermum caeruleum* subsp. *contortum***



*Eryngium subdecumbens* (Benth.) Keighery ms

APIACEAE

Prostrate perennial herb to 0.15 m high. Flowers white to green

**Flowering Period:** October to November

**Distribution and Habitat**

Occurs in seasonally wet flats, claypans and swamps on clay and grey sand along the Swan Coastal Plain.

**Conservation Status**

Priority 1

**Known Populations**

|   | Population   | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---|--------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 | Fish Road NR | SWC      | BSN   | NR          | 14.10.92    | -             | -         |
| 2 | Ruabon NR    | SWC      | BSN   | NR          | 8.11.92     | -             | -         |

**Response to Disturbance**

Unknown

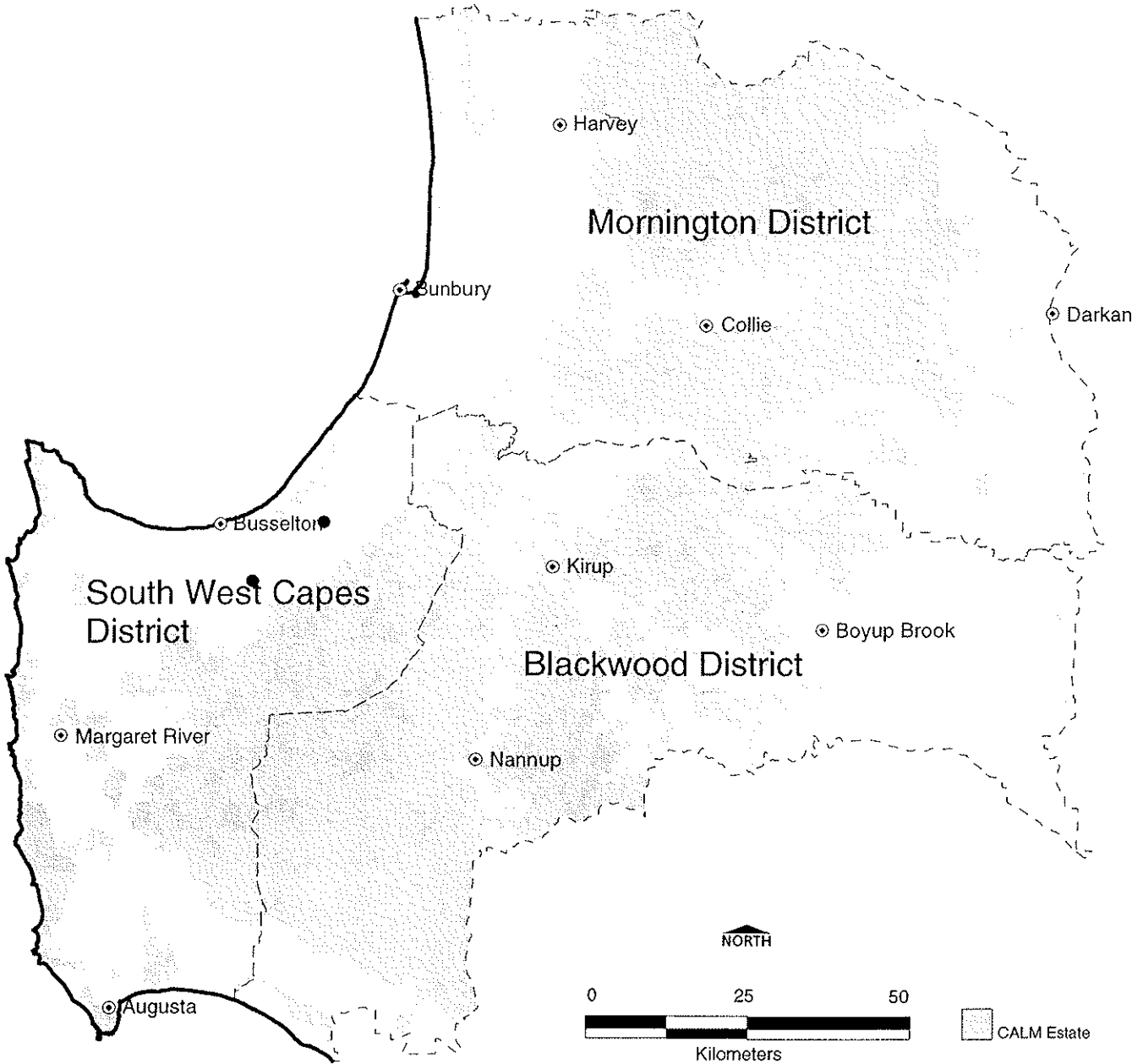
**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● ***Eryngium subdecumbens* ms**

*Eucalyptus lane-poolei* Maiden var. *Whicher* (S.D. Hopper 6316)

MYRTACEAE

A straggly small tree or mallee, thick trunked and up to 3 m tall, with rough grey-brown bark which continues up to the small branches. No pith glands are evident in the branch wood. The canopy is yellowish green and the adult leaves are curved lanceolate and slightly discolorous.

The var. *Whicher* differs from *E. lane-poolei* in having rough bark rather than a mostly smooth, orange brown bark which weathers to grey or whitish. The discolorous leaves are also a distinguishing feature.

**Flowering Period:** Possibly December

**Distribution and Habitat**

This variant is known from only one specimen collected south-east of Yoongarillup, south of Busselton in 1987 in loam and laterite on the bank of a creekline. Associated species were *E. marginata* and *Corymbia calophylla* over open scrub with *Xanthorrhoea preissii*, *Dasypogon hookeri* and *Grevillea diversifolia*.

**Conservation Status**

Priority 1

**Known Populations**

| Population      | District | Shire | Land Status | Last Survey | No. of Plants  | Condition |
|-----------------|----------|-------|-------------|-------------|----------------|-----------|
| 1 Whicher Block | SWC      | BSN   | -           | 6.11.87     | isolated clump | -         |

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

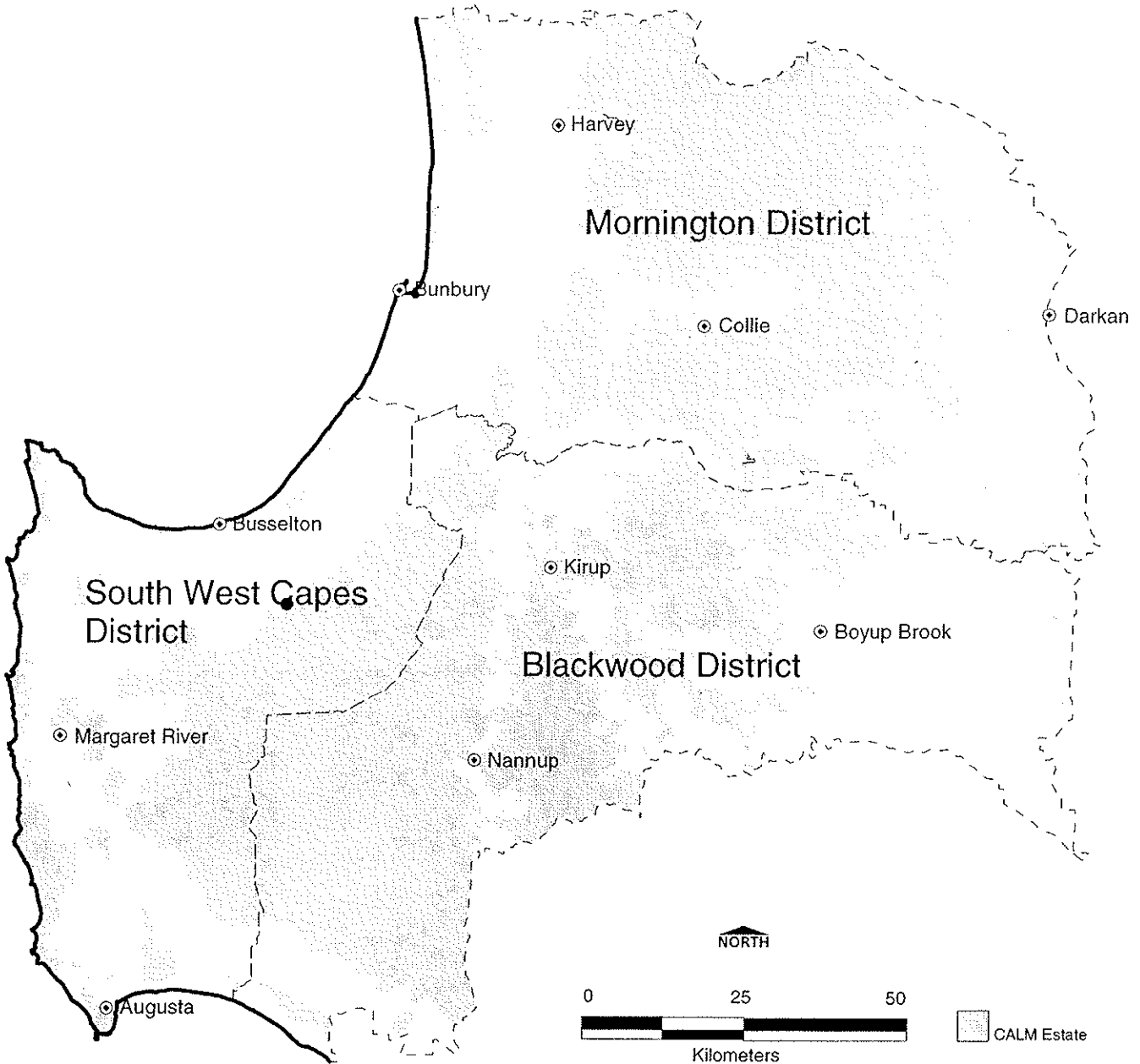
**Management Requirements**

1. Further survey
2. Seed collection.

**Research Requirements**

1. Response to fire

# Central Forest Region Threatened Flora Management Plan



● ***Eucalyptus lane-pooliei* var. *Whicher* (S.D.Hopper 6316)**

## *Eucalyptus x mundijongensis*

## MYTRACEAE

*Eucalyptus x mundijongensis* is a tall tree to 24 - 30 m high and a trunk diameter of about 1.5 m about 1 m from the ground. The bark is fine and adherent at the base, and flakes off in long woody strips. In the upper branches, the bark is smooth. The timber is pale coloured. Juvenile leaves are coarse, thick, moderately shiny, equally green on both sides and 12 cm long x 2 cm wide. The mature leaves are narrow lanceolar, somewhat curved, shiny, equally green on both sides, with inconspicuous and feather-like venation. Buds are club-shaped (clavate) with a pointed operculum about 1 cm long with a pedicel of about 0.5 cm and peduncles are 1.5 - 2 cm in length. There are 3 - 7 buds to each inflorescence. The fruits are about 1.5 cm long x 0.75 cm in diameter with a thin grooved rim.

*Eucalyptus x.mundijongensis* resembles *E. incrassata* but can be distinguished by being taller, and having an operculum which is shorter than the calyx.

**Flowering Period:** Matilda Bay tree observed in flower in June.

### Distribution and Habitat

Known from three disjunct populations at Wilbinga, Matilda Bay and Dardanup. A single tree only is present at Matilda Bay and Dardanup, and a single mature and several immature specimens at Wilbinga. No details of associated vegetation are available - the Dardanup tree was recorded in loam in a cleared paddock, similarly the Matilda Bay tree is within a cleared area, whilst vegetation details are not recorded at Wilbinga.

### Conservation Status

Priority 1

### Known Populations

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Boyanup  | MON      | DAR   | PP          | 8.10.77     | 1             | -         |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

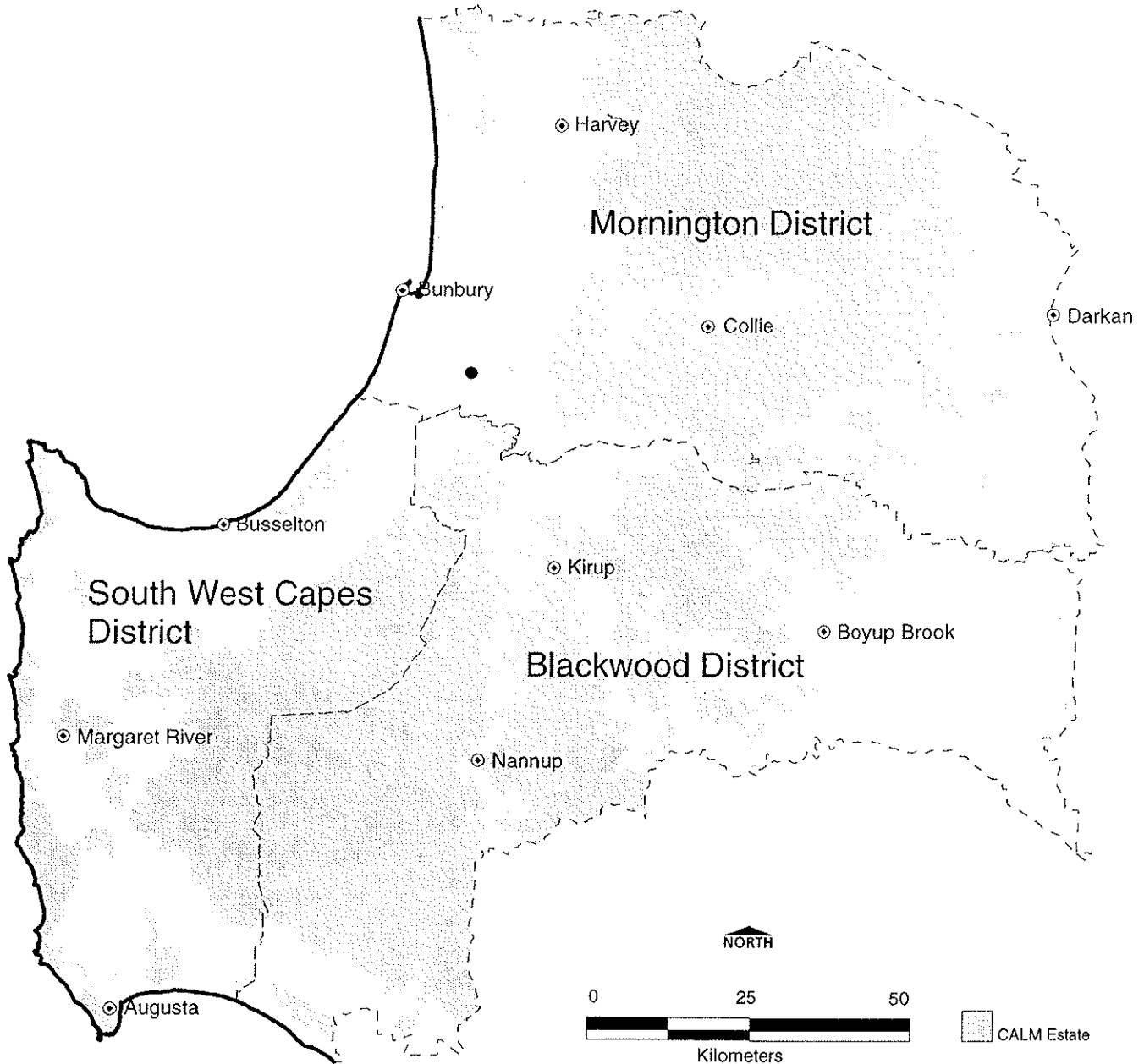
1. Further survey
2. Germplasm collection

### Research Requirements

### Reference:

Maiden, J.H. (1913) Notes on Eucalyptus (with descriptions of new species), No II. *Journal and Proceedings of the Royal Society of New South Wales* 47, 217-235.

# Central Forest Region Threatened Flora Management Plan



● ***Eucalyptus mundijongensis* X**

## *Grevillea* sp. Scott River (G.J. Keighery 4070)

## PROTEACEAE

*Grevillea* sp. Scott River is an erect spreading shrub to 1.5 m high x 1.5 m wide with densely hairy branchlets. The green leaves are to 6 cm long x 5 cm wide and wedge-shaped, with 5 - 12 pungent points at the apex. The leaf underside is densely hairy however the upper surface becomes glabrous with age. The inflorescence is a toothbrush-like raceme to 4 cm long of green-red flowers which are bearded inside.

*Grevillea* sp. Scott River differs from *G. manglesioides* in the wedge-shaped leaves (*G. manglesioides* has leaves ending in 3 or 5 triangular lobes) toothbrush shaped inflorescences and green-red flowers (*G. manglesioides* has white to red flowers). It will be described as a variant of *G. manglesioides*.

**Flowering Period:** July to December

### Distribution and Habitat

This species is apparently confined to the Scott Plain, where it occurs in dense heath on clay over ironstone.

### Conservation Status

Priority 1

### Known Populations

| Population            | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Scott River Plain   | SWC      | AMR   | Shire       | 1.1.92      | 100           | -         |
| 2 Beenup (Loc. 4262)  | SWC      | AMR   | PP/NR       | 16.12.97    | 100's         | good      |
| 3 Governor Broome Rd  | SWC      | AMR   | Shire       | 10.12.97    | 100's         | good      |
| 4 Dennis Rd           | SWC      | AMR   | Shire       | 10.12.97    | 50+           | good      |
| 6 Sues                | BWD      | AMR   | SF          | 1.12.30     | -             | -         |
| 8 Milyeannup Coast Rd | SWC      | AMR   | Shire, NP   | 3.7.97      | 50+           | good      |

### Response to Disturbance

Known to be killed by fire, Keighery, but response to other disturbances unknown.

### Susceptibility to *Phytophthora* Dieback

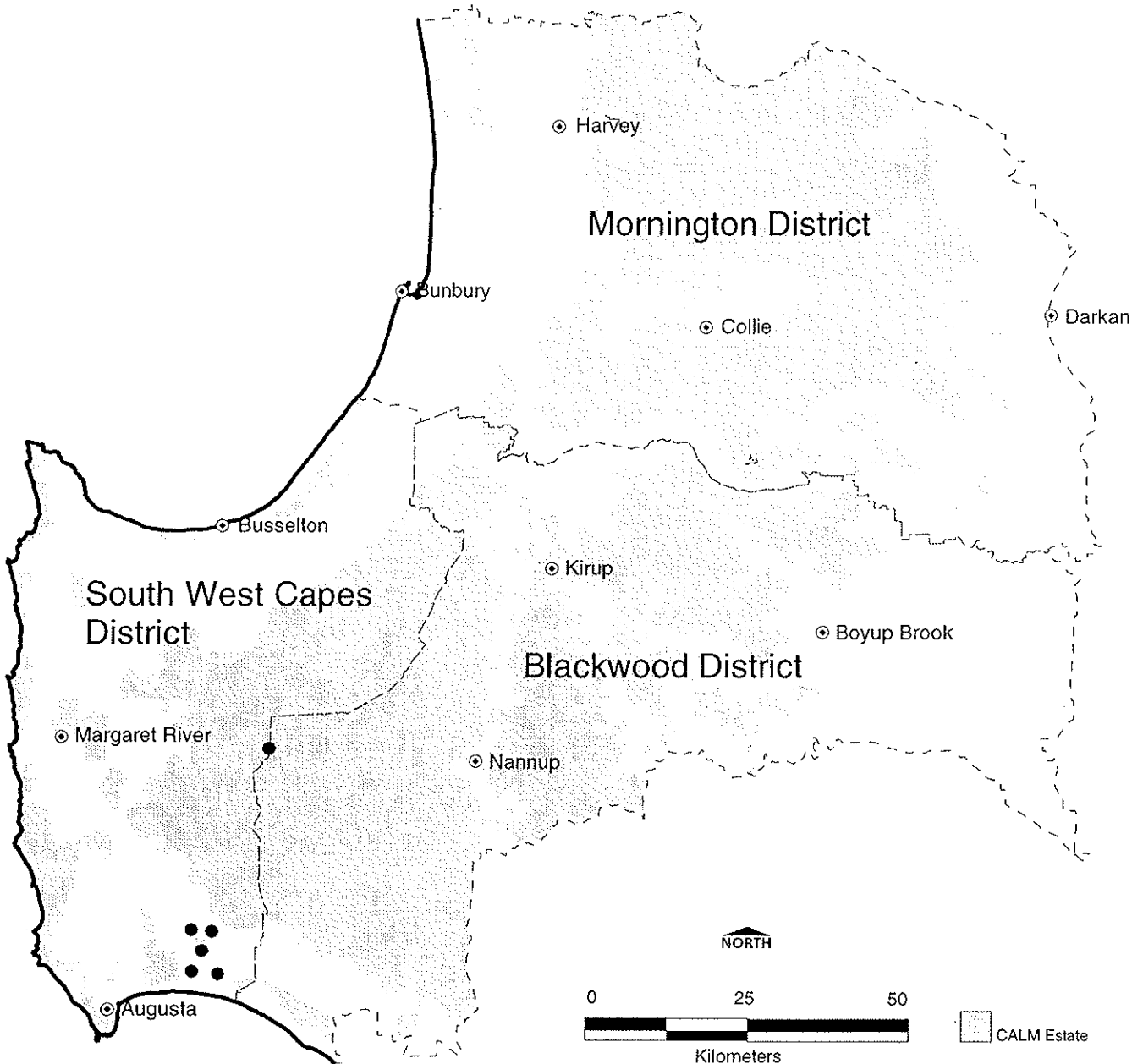
Unknown, although probably not susceptible as dieback already occurs in the area.

### Management Requirements

1. Maintain liaison with neighbours re: stock proof fencing and fire management.

### Research Requirements

# Central Forest Region Threatened Flora Management Plan



- ***Grevillea* sp. Scott River (G.J. Keighery 4070)**  
**[aff. *manglesoides*]**



## *Haloragis tenuifolia* Benth.

## HALORAGACEAE

A hairless annual herb, usually 20 - 30 cm, but up to 50 cm tall, with smooth (or very weakly 4-ribbed) stems, more or less unbranched. The narrow leaves are sessile, the larger ones to 2.5 - 5 cm long with a few narrow-linear lobes. The flowers are small, greenish with 1 - 3 (sometimes 5) borne on short pedicels in leafy spikes arising in the axils of the floral leaves or bracts. Each flower has 3 broadly-ovate sepals 6 mm long x 7 mm wide, and 3 clawed petals which are rounded at the tips, about 3 mm long x 1 mm wide. The fruit is a 3-chambered nut to 2.4 mm long x 1.6 mm wide, smooth or slightly bumpy, containing 1 - 3 seeds and crowned by persistent sepals.

This species was described by Benthham in 1864. It is closely related to *H. brownii*, but differs in its more slender habit and 3-celled (rather than 2-celled) fruit.

**Flowering Period:** November to December

### Distribution and Habitat

*H. tenuifolia* is known from three (two if amalgamate 1 and 3) locations near Ruabon, and a further four locations in the metropolitan area. However the most recent metropolitan collection at Maddington occurred in 1963, with collections at Midland Junction, Byfields Mill and Wooroloo dating from 1930, 1900 and 1907 respectively. It appears to favour damp or swampy places and within the Central Forest Region occurs on red brown clay over ironstone (east of Ruabon) and black sandy soil (Ruabon) in low open shrubland.

### Conservation Status

Priority 1

### Known Populations

| Population      | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Wellard NR    | MON      | HVY   | NR          | 3.11.94     | -             | -         |
| 2 Scott River   | SWC      | AMR   | Shire       | 5.95        | -             | -         |
| 3 Wonnerup Road | SWC      | BSN   | Road        | 9.11.87     | common        | -         |
| 4 Ruabon        | SWC      | BSN   | -           | 17.9.77     | uncommon      | -         |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

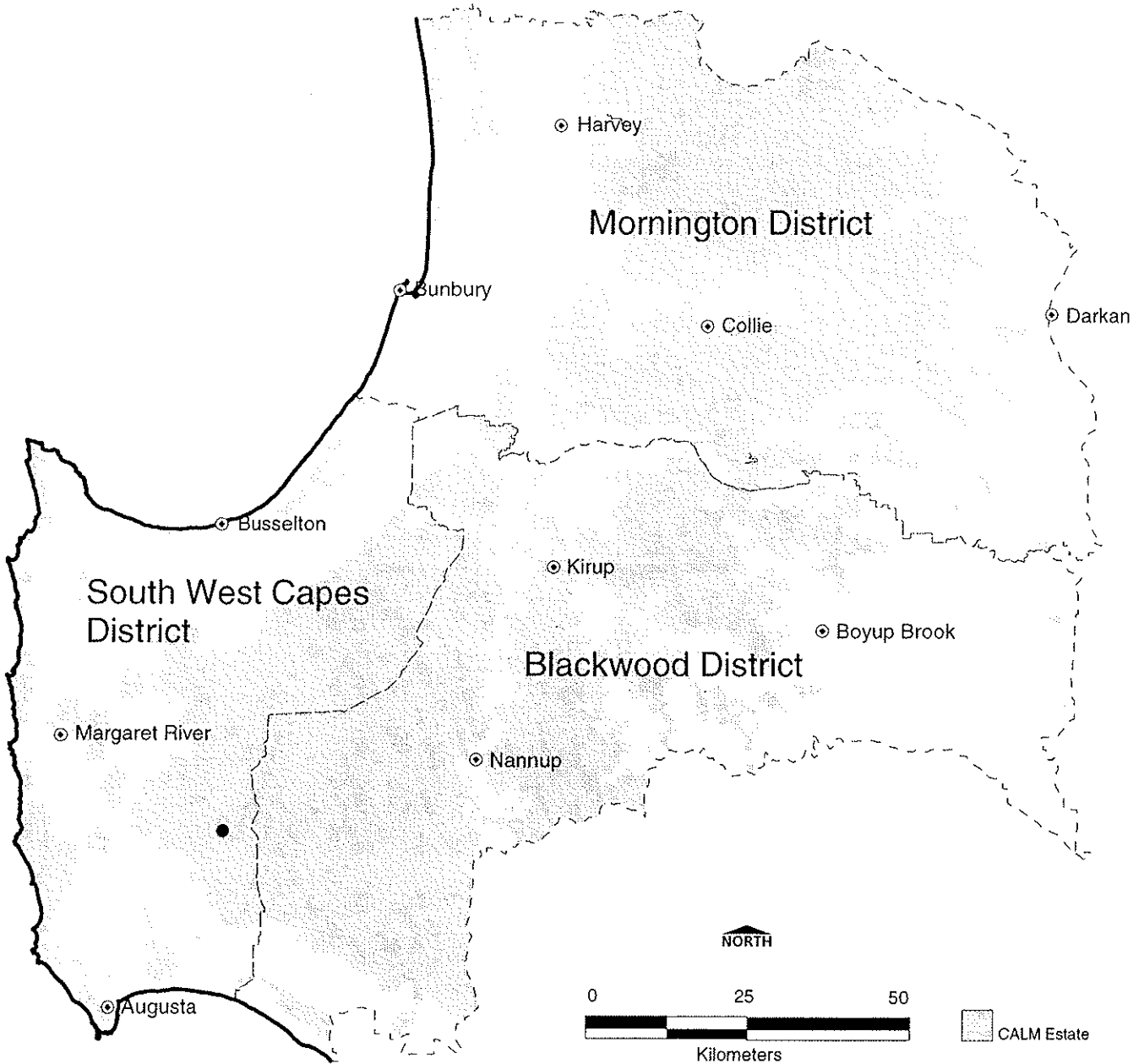
1. Further survey.
2. Liaison with shire.
3. Monitor and control weeds where required.

### Research Requirements

### Reference

Leigh, J., Boden, R. and Briggs, J. (1984) *Extinct and Endangered Plants of Australia*. Macmillan, South Australia.

# Central Forest Region Threatened Flora Management Plan



● **Haloragis tenuifolia**

*Hemigenia ramosissima* Benth.

LAMIACEAE

Slender shrub to 0.5 m high. Flowers blue to purple.

**Flowering Period:** November to December, or January.

**Distribution and Habitat**

Grow amongst granite outcrops on lateritic soils over clay.

**Conservation Status**

Priority 1

**Known Populations**

| Population        | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Williamson Road | SWC      | BSN   | SF          | -           | -             | -         |
| 2 Yallingup       | SWC      | BSN   | Verge       | -           | -             | -         |

**Response to Disturbance**

Unknown

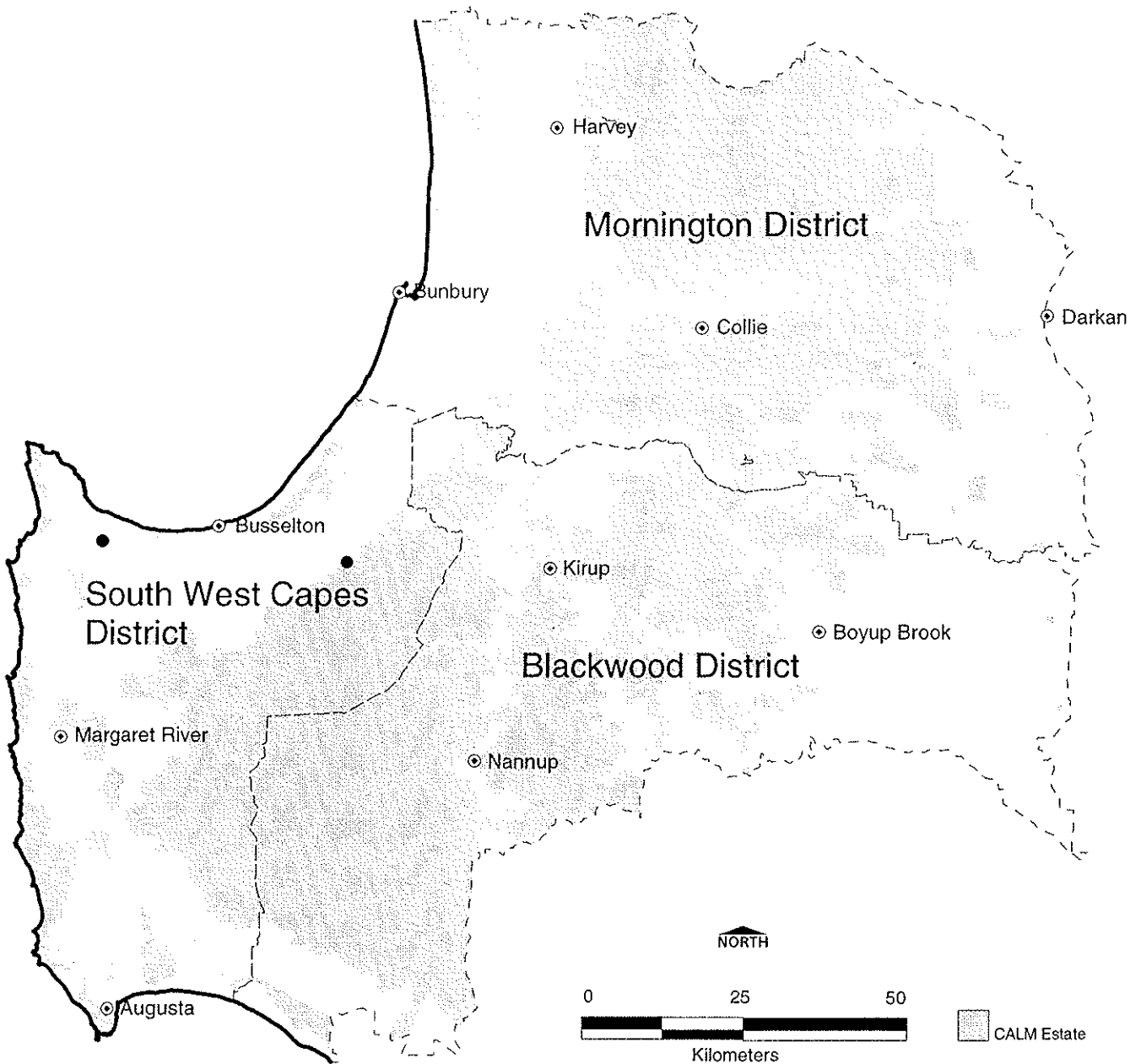
**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● ***Hemigenia ramosissima***

## *Johnsonia inconspicua* Keighery

## ANTHERICAEAE

*Johnsonia inconspicua* is a large, glabrous, clumped herb to 30 cm in diameter. Scapes are 17 - 35 cm long and phyllodes 15 - 40 cm long x 2 - 4 mm wide with an acute apex. The inflorescences are cylindrical with peduncles 17 - 35 cm long. Inflorescence bracts are ovate, acute, 6 - 12 mm long x 4 - 9 mm wide, greenish white or pale pink with central brown stripe. Bracteoles are linear, 4 - 5 mm long. The perianth is 4 - 6 mm long, fused for approximately 1 mm and white. The sepals are wider than the petals. The anthers and style are all about 3 mm long.

**Flowering Period:** October to November

### **Distribution and Habitat**

Now known only from the Yelverton Forest area, in deep white-grey sand and winter wet peaty sand. The type population located near Carbanup River has been destroyed by the expansion of the nearby tip and sand mine. Associated vegetation was *Banksia/Allocasuarina* woodland (Yelverton) and sedgeland (Metricup Rd.) The destroyed type population was located in *Agonis flexuosa* woodland.

### **Conservation Status**

Priority 1

Currently known from a Shire reserve and State Forest a portion of which is located in rail reserve. The Shire reserve is gazetted for landscape protection. Hence there are no populations on flora and fauna reserves at present.

### **Known Populations**

| Population          | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Margaret River Rd | SWC      | BSN   | Shire       | 19.11.80    | -             | destroyed |
| 2 Yelverton         | SWC      | BSN   | SF, Road    | 8.11.89     | common        | -         |
| 3 Metricup Rd       | SWC      | BSN   | Shire       | 8.11.89     | -             | -         |

### **Response to Disturbance**

Unknown

### **Susceptibility to *Phytophthora* Dieback**

Not susceptible, population is expanding inside dieback area.

### **Management Requirements**

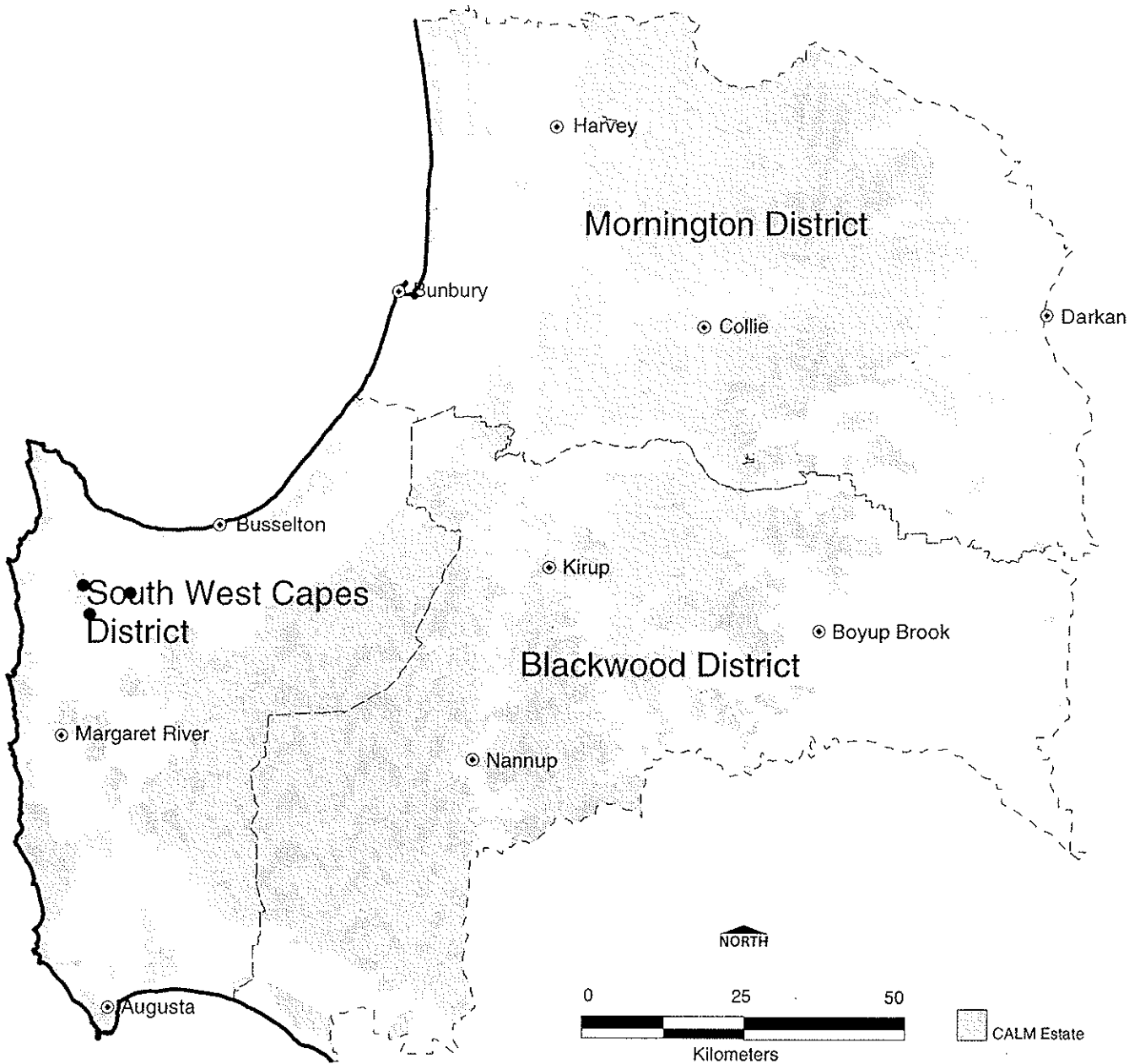
1. Further survey
2. Investigate possible vesting of Yelverton SF to Nature Reserve.

### **Research Requirements**

### **References**

Keighery, G.J. (1987) *Flora of Australia* (Hydatellaceae to Liliaceae), Vol 45, p246. National Library of Australia, South Australia.

# Central Forest Region Threatened Flora Management Plan



## ● *Johnsonia inconspicua*

## *Nemcia cordata* Crisp ms

## PAPILIONACEAE

Slender, erect open shrub to 1.5 m high. Single stemmed at base. Flowers yellow and red.

**Flowering Period:** October

### **Distribution and Habitat**

In Dardanup Forest Block grows on sandy clay over quartzite (pop 3) and laterite (pop 4) under a low *Corymbia haematoxylon* woodland.

### **Conservation Status**

Priority 1

### **Known Populations**

| Population     | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 J Scott      | SWC      | BSN   | PP          | 1.9.69      | -             | -         |
| 2 Yoongarillup | SWC      | BSN   | -           | 10.70       | -             | -         |
| 3 Dardanup     | MON      | DAR   | SF          | 30.10.96    | common        | good      |
| 4 dard01       | MON      | DAR   | SF          | 10.11.93    | -             | -         |

### **Response to Disturbance**

Responds to fire.

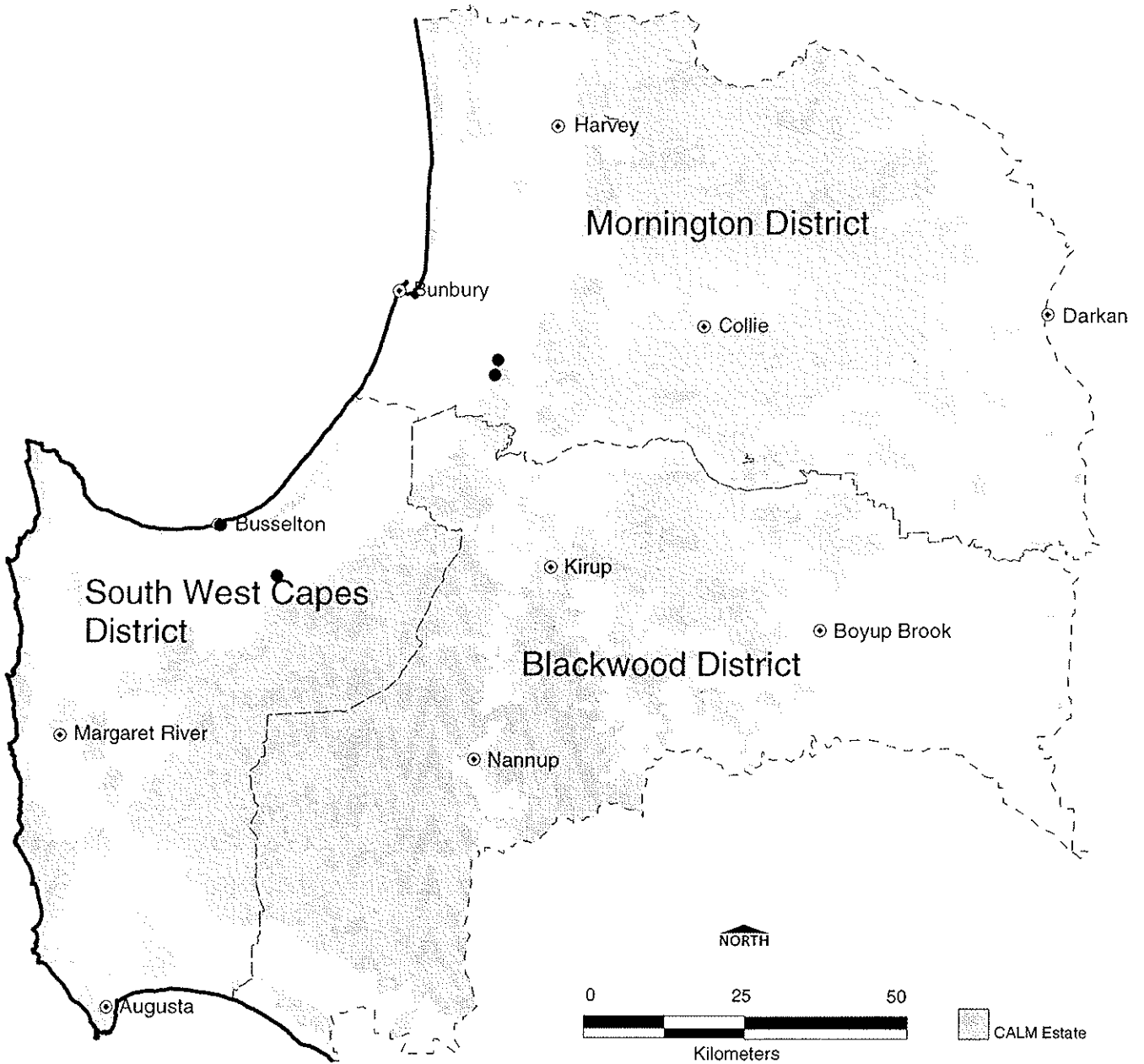
### **Susceptibility to *Phytophthora* Dieback**

Unknown

### **Management Requirements**

### **Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● ***Nemcia cordata ms***



*Philydrella pygmaea* R.Br. (Caruel) subsp. *minima* L. Adams

PHILYDRACEAE

A perennial herb with 2 leaves; one basal and the other above the centre of the stem, sheathing in the lower part. The basal leaf is 3 - 6 cm long and the cauline leaf 8 - 10 cm long. The flower stalk is 5 - 9 cm long, strongly reddish with a 2 - 4 flowered spike. The flowers open from the base upward. Flower bracts are 5 - 6 mm long, initially erect and overlapping, but become strongly reflexed during flowering and return to an erect position after flowering. Flower is bright yellow, the outer tepals are 4 - 5 mm long and the inner tepals 3 mm long.

*Philydrella pygmaea* subsp. *minima* can be distinguished from subsp. *pygmaea* by its smaller size and smaller anther locules (ca. 0.6 mm wide compared to 1 - 1.5 mm) and seed capsules (3 mm long compared to 5 - 6 mm).

**Flowering Period:** Not known

**Distribution and Habitat**

The type specimen was collected in 1898 from Bayswater, however only one location is known at Long Swamp north of Augusta. It was located in damp hollows, however no associated vegetation details were recorded.

**Conservation Status**

Priority 1

**Known Populations**

| Population   | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Long Swamp | SWC      | AMR   | -           | 8.12.74     | -             | -         |

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

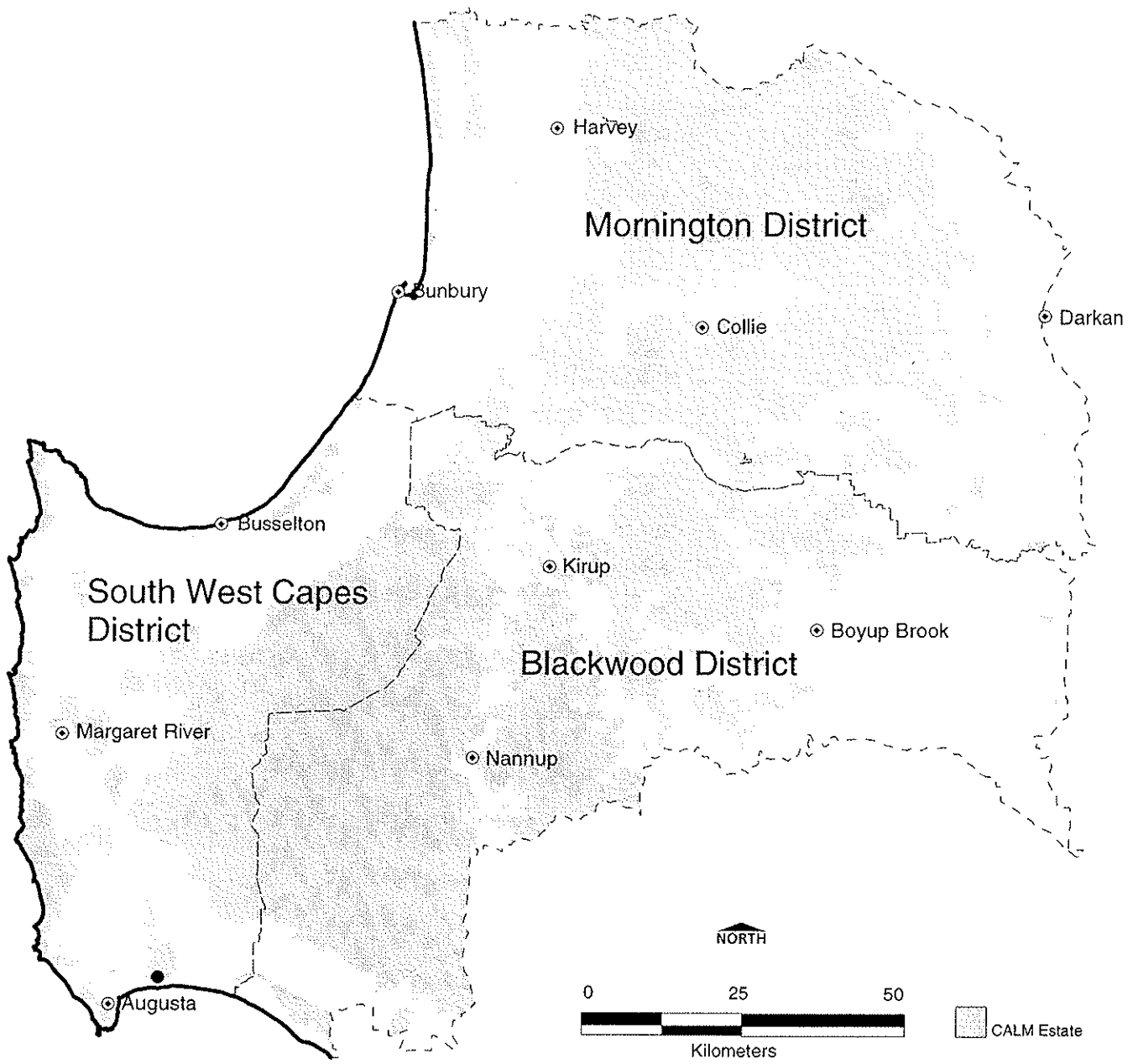
1. Urgent survey of the Long Swamp location to confirm existence of this population.

**Research Requirements**

**References**

Adams, L.G. (1987) *Flora of Australia* (Hydatellaceae to Liliaceae), Vol 45, p43. National Library of Australia, South Australia.

# Central Forest Region Threatened Flora Management Plan



● *Philydrella pygmaea* subsp. *minima*

## *Pterostylis turfosa* Endl.

## ORCHIDACEAE

Tuberous perennial herb, 10 – 18 cm high. Flowers green.

**Flowering Period:** September to October

### **Distribution and Habitat**

Occurs on sandy clay soils in Jarrah forest, on the Swan Coastal Plain and in the Warren district. CFR populations include the Capel Nature Reserve, Wellington Mills Jarrah forest, and three populations in the D'Entrecasteaux National Park.

### **Conservation Status**

Priority 1

### **Known Populations**

| Population             | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Wellington Mills     | MON      | DAR   | SF          | 18.10.96    | -             | -         |
| 2 Capel Nature Reserve | SWC      | CAP   | NR          | 19.10.94    | -             | -         |
| 3 Lake Jasper          | BWD      | NAN   | NP          | 30.10.90    | -             | -         |
| 4 Black Point          | BWD      | NAN   | NP          | 1.11.90     | -             | -         |
| 5 Lake Jasper Road     | BWD      | NAN   | NP          | 30.12.90    | -             | -         |

### **Response to Disturbance**

Unknown

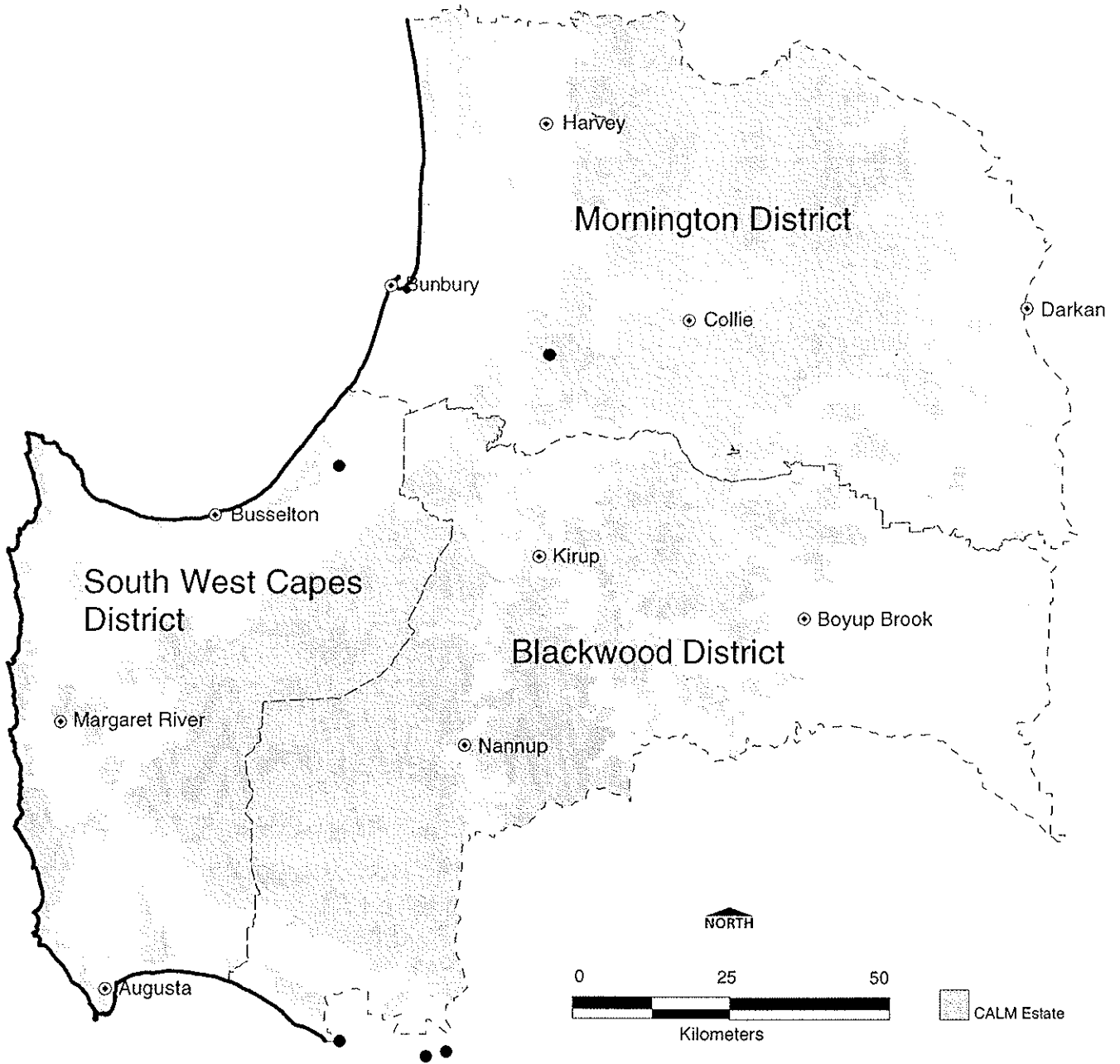
### **Susceptibility to *Phytophthora* Dieback**

Unlikely to be susceptible.

### **Management Requirements**

### **Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● ***Pterostylis turfosa***

*Schoenus indutus* (F. Muell.) Benth.

CYPERACEAE

Perennial, grass-like herb (sedge) to 0.6 m high. Flowers brown.

**Flowering Period:** October

**Distribution and Habitat**

The CFR population occurs on black sand over clay at the edge of a swamp in the Scott National Park.

**Conservation Status**

Priority I

**Known Populations**

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| I Scott NP | SWC      | AMR   | NP          | 28.1.88     | common        | -         |

**Response to Disturbance**

Unknown

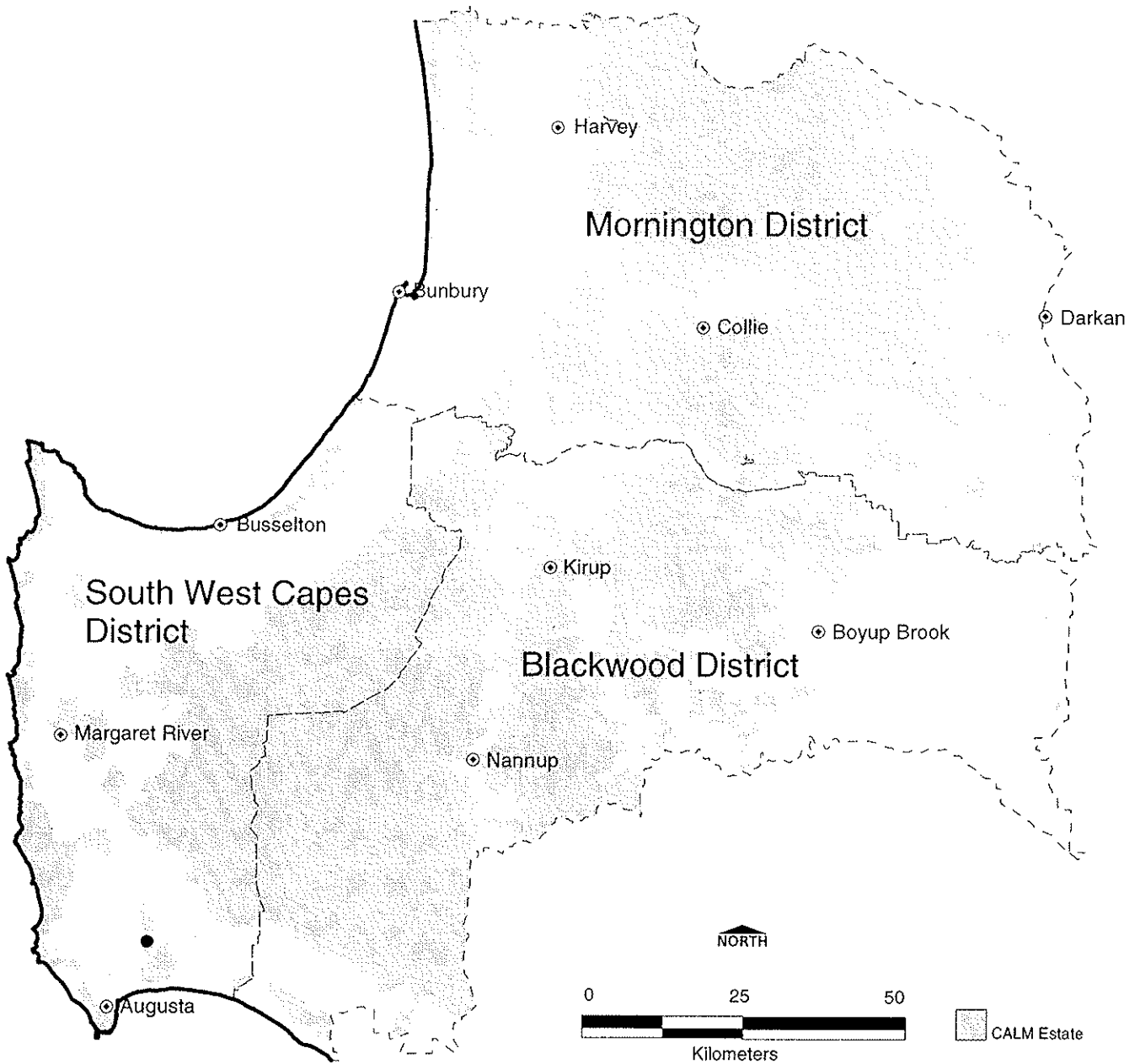
**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● **Schoenus indutus**

## *Schoenus pennisetis* S.T. Blake

## CYPERACEAE

Tufted annual, grass-like of herb (sedge) 0.05 – 0.15 m high. Flowers dark purple to black.

**Flowering Period:** August to September

### **Distribution and Habitat**

*S. pennisetis* occurs on grey or peaty sand to sandy clay in swamps and winter wet depressions. Its distribution extends from the mid wheatbelt to the Avon and Swan Coastal Plain. The CFR populations are located in the Ruabon/Tutunup area near Busselton.

### **Conservation Status**

Priority 1

### **Known Populations**

|   | Population      | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---|-----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 | Wonnerup Road   | SWC      | BSN   | Shire       | 1.9.87      | common        | -         |
| 2 | Williamson Road | SWC      | BSN   | Shire       | 12.11.93    | -             | -         |

### **Response to Disturbance**

Unknown

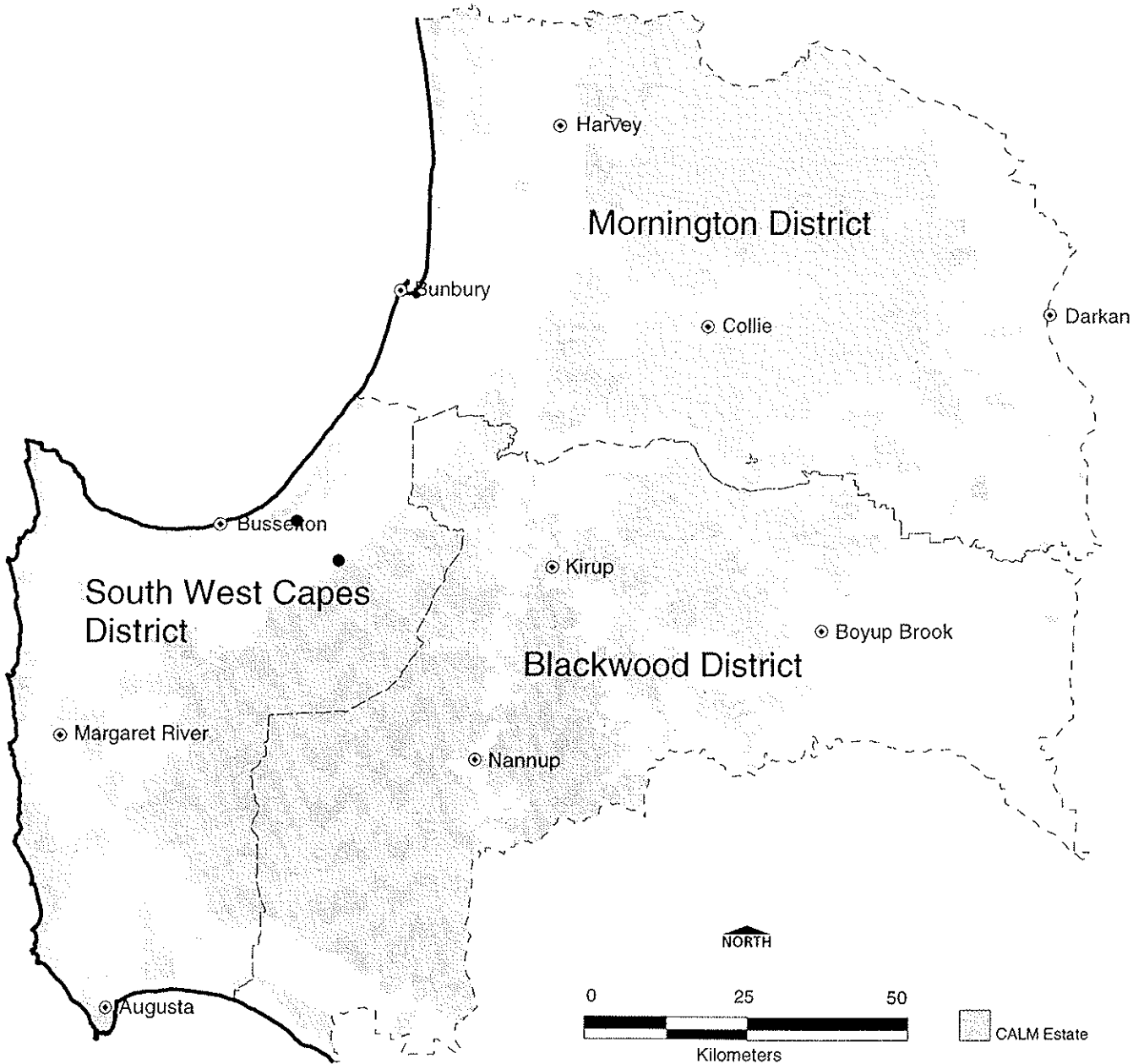
### **Susceptibility to *Phytophthora* Dieback**

Unknown

### **Management Requirements**

### **Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● **Schoenus pennisetis**



*Schoenus* sp. Jindong (R.D. Royce 2485)

CYPERACEAE

Sedge

**Flowering Period:** Unknown

**Distribution and Habitat**

Red loamy soils on the banks of a stream.

**Conservation Status**

Priority 1

**Known Populations**

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Jindong  | SWC      | BSN   | -           | 3.11.48     | -             | -         |

**Response to Disturbance**

Unknown

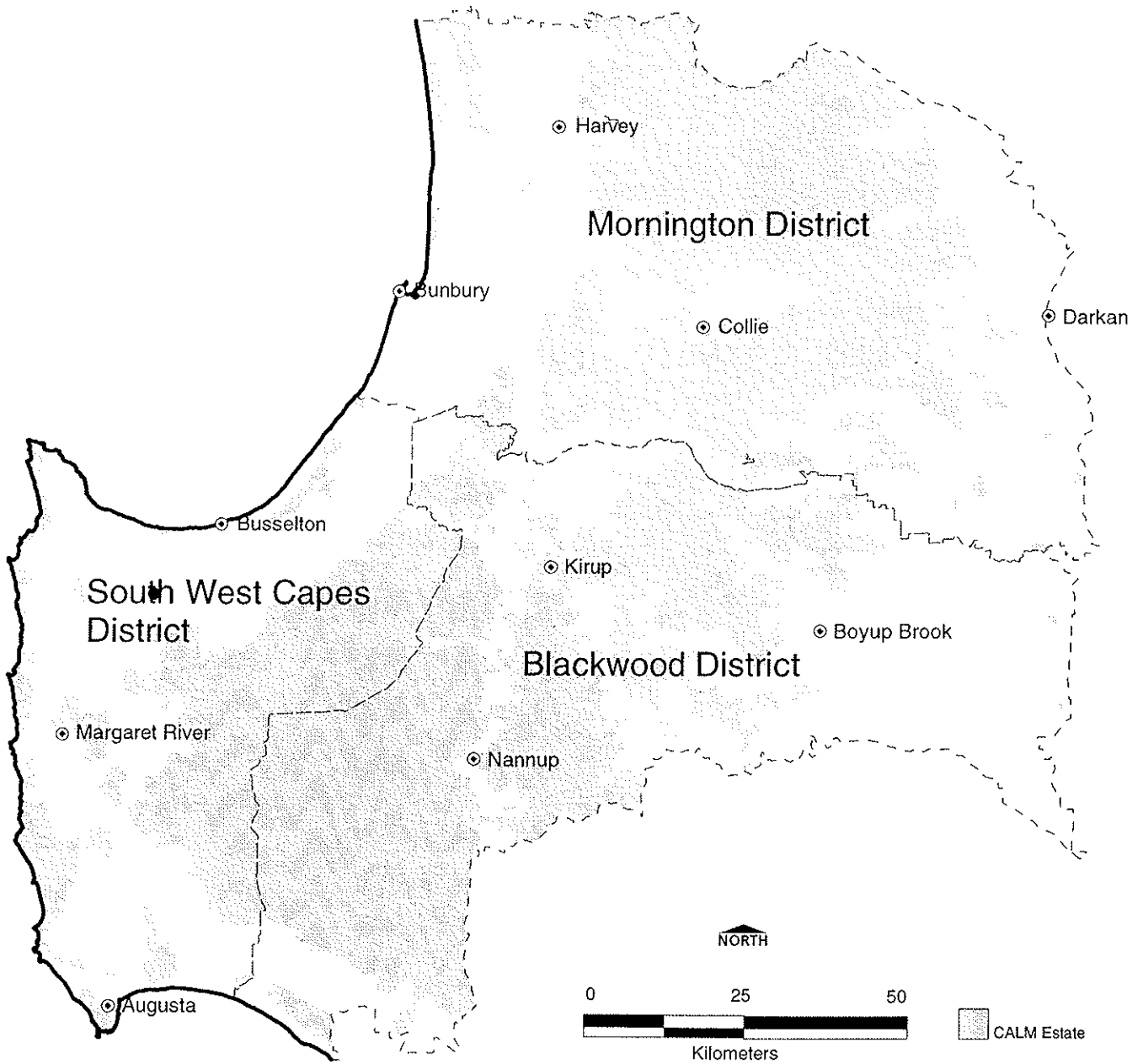
**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● **Schoenus sp. Jindong (R.D. Royce 2485) ms**

# *Stylidium rhipidium* F.L. Erickson and J.H. Willis

## STYLIDIACEAE

### Fan Trigger-Plant

*Stylidium rhipidium* is a small, slender, slightly glandular-hairy annual up to 5 cm tall. The reddish, smooth leaves are from 2 - 4 mm long and form a sparse basal rosette. The slender scape is 1 or 2-flowered, dark coloured and sparsely covered throughout with glandular hairs. There are two or more glabrous green bracts, one of which occurs halfway up the scape. The calyx is greenish-red, oblong and twisted, slightly glandular with the lobes shorter than the tube. Two of the lobes are fused almost to the apex. The corolla is white, fan-shaped, the larger petals 5 - 6 mm long, narrow at the base and gradually widening, the lesser petals rounded and about 2 mm long. There are six throat appendages with distinctly rounded heads. The fleshy labellum is minute and pointed. The column is pale, short and slender, with black anthers.

*Stylidium rhipidium* differs from the *S. petiolare* group by the absence of a bulbous root-stock, and is distinct from the *S. despectum* group in its fan-shaped corolla and six throat appendages.

**Flowering Period:** October to November

### Distribution and Habitat

Known from Williams, Rocky Gully, north of Kojonup, Mt. Caroline NR, Collie and Cranbrook. It has a preference for moist environments, including mud flats, along drainage lines and on drainage affected aprons at the foot of granite rocks. It is associated with granitic soils and in the Collie population occurred on saturated quartzite gravel in a drainage line within a swamp. Associated vegetation is listed for the type locality at Williams as grasses and sedges and a number *Stylidium* species.

### Conservation Status

Priority 1

Although known from a number of localities over a relatively broad range, only the Mt Caroline population is in a conservation reserve and the majority occurs near highways. It appears the Williams population may have been destroyed by encroaching agricultural grasses and/or salination. The Central Forest population at Collie occurs on the Griffin mining lease.

### Known Populations

| Population      | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Griffin Lease | MON      | COL   | -           | 13.11.79    | common        | -         |

### Response to Disturbance

Possibly vulnerable to grass invasion (Narrogin notes)

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

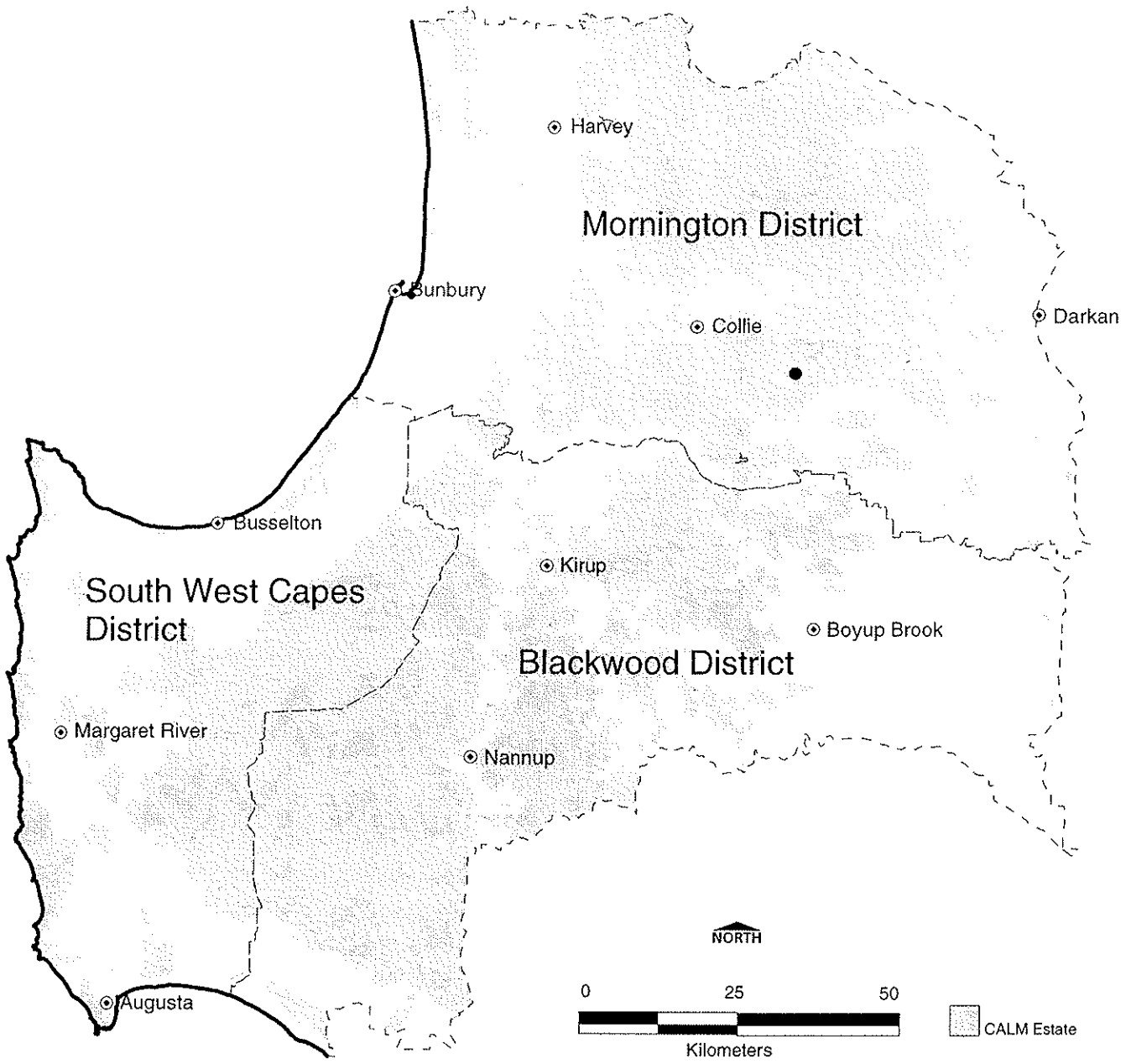
1. Further survey is required to confirm existence of this population.
2. Maintain liaison with Griffin Coal.

### Research Requirements

### References

Erickson, R. and Willis, J.H. (1966) Some additions to Australian Stylidiaceae. *Victorian Naturalist* 83, 107-112.

# Central Forest Region Threatened Flora Management Plan



● **Stylidium rhipidium**

*Stylidium tylosum* Lowrie & Kenneally

STYLIDIACEAE

Basally rosetted perennial herb. Flowers yellow.

**Flowering Period:** October to November

**Distribution and Habitat**

Occurs on sandy clay soils in the watershed run-off areas from granite outcrops within Jarrah forest.

**Conservation Status**

Priority 1

**Known Populations**

| Population  | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-------------|----------|-------|-------------|-------------|---------------|-----------|
| 2 Moodiarup | MON      | WEA   | Shire       | 31.10.94    | occasional    | -         |

**Response to Disturbance**

Unknown

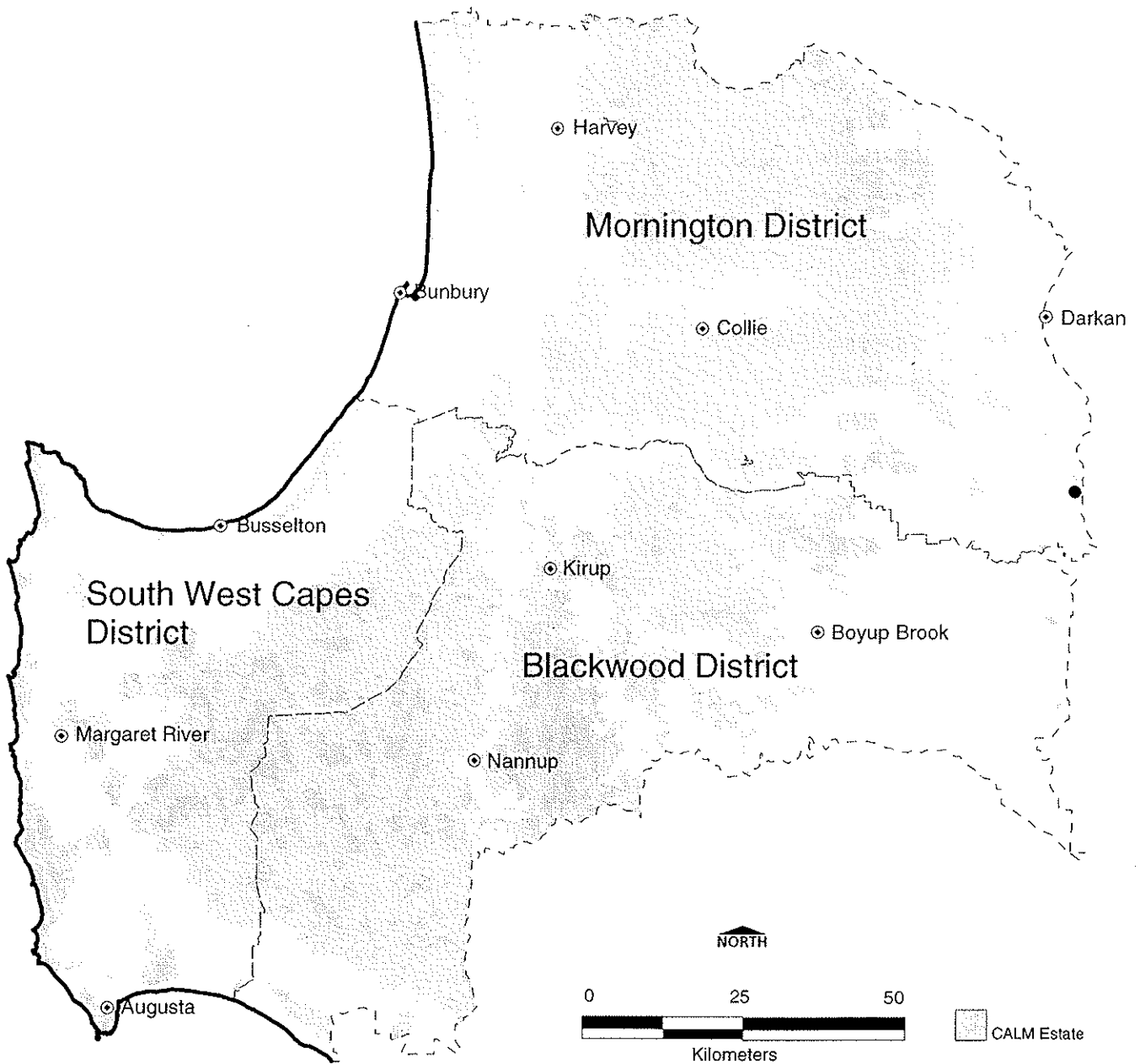
**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● **Stylidium tylosum**

## *Synaphea macrophylla* A.S.George

## PROTEACEAE

*Synaphea macrophylla* is a low subshrub with decumbent stems to 20 cm long, appressed-puberulous. Leaves are flabelliform, flat or concave, simple, and shortly 2 - 5 lobed across the apex. Inflorescence is a spike 7 - 10cm long, yellow flowers moderately crowded; peduncle to 30 cm long, sparsely puberulous. Perianth moderately ascending to spreading, opening widely, glabrous. Stigma transversely oblong, prominently 2-lobed; ovary hirsute. Fruit obovoid, 5 - 6 mm long and pilose.

**Flowering Period:** October

### **Distribution and Habitat**

Species has only been collected once from near the Blackwood River, found in Jarrah/Marri forest in orange/brown gravelly loam.

### **Conservation Status**

Priority 1

### **Known Populations**

| Population     | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Brockman Hwy | SWC      | AMR   | PP          | 30.10.97    | 6             | good      |

### **Response to Disturbance**

Unknown

### **Susceptibility to *Phytophthora* Disease**

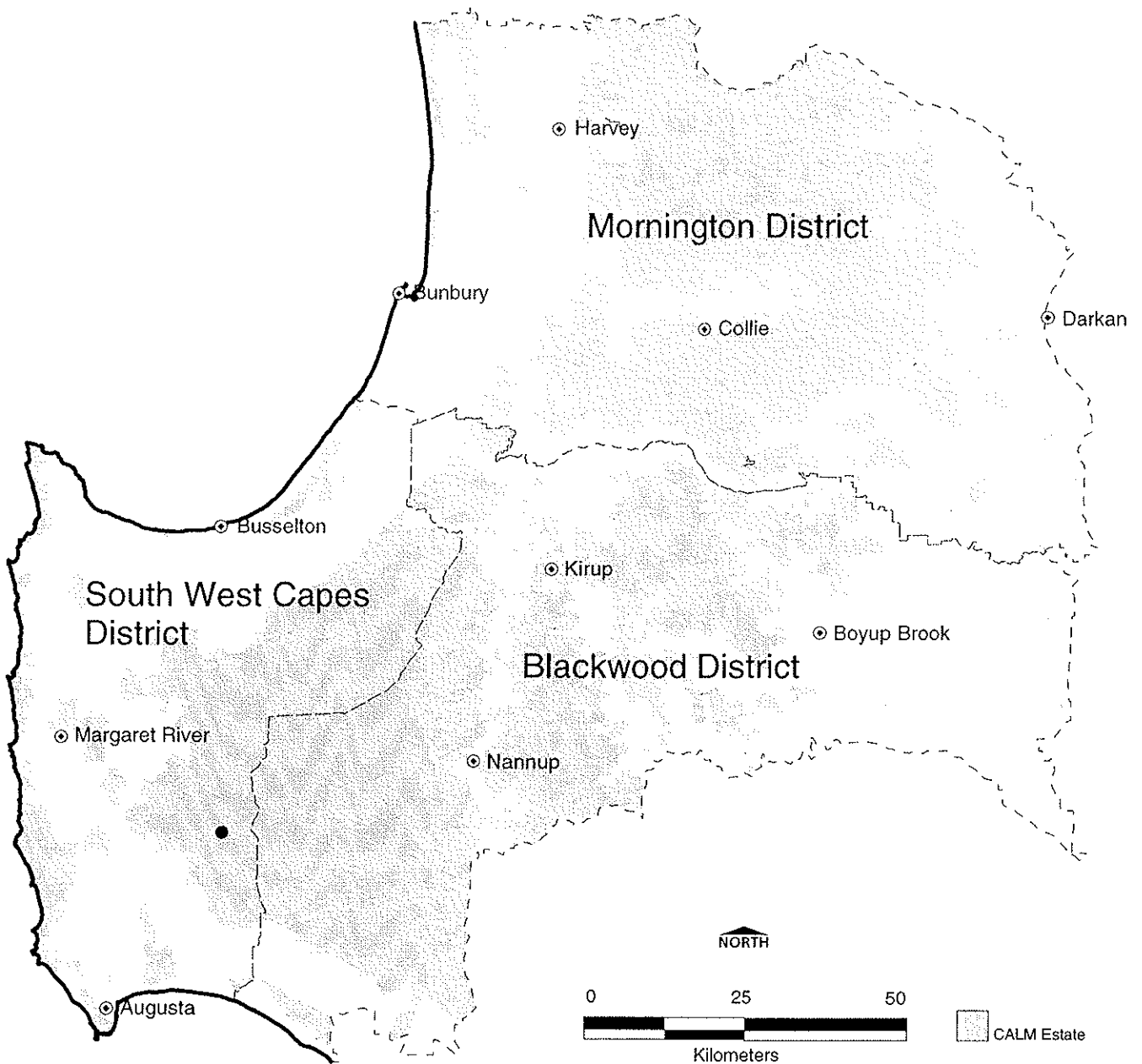
Unknown

### **Management Requirements**

1. Further surveys to determine range of species.

### **Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● ***Synaphea macrophylla***



## *Synaphea nexosa* A.S.George

## PROTEACEAE

*Synaphea nexosa* is a densely tangled shrub to 1 m tall, stems to 30 cm long, glabrous or almost so. Leaves deeply 3-lobed, obtuse, roughly flat, with a few appressed hairs when young becoming glabrous; petiole 13 – 30 cm long. Inflorescence a spike 10 – 30 cm long, dull yellow flowers widely spaced. Peduncle to 60 cm long; rachis red and sparsely puberulous near base, glabrous above. Perianth ascending, opening widely, glabrous; stigma lunate with prominent horns. Fruit ellipsoidal, beaked, on prominent neck, glabrous except for a few hairs near the base.

**Flowering Period:** October to November

### **Distribution and Habitat**

This species is found on the Scott River Plain, in winter-wet brown clay-loam soils over ironstone at some depth. Associated vegetation is low scrub of predominantly *Grevillea papillosa*, *Calothamnus* sp. *Scott River*, and *Adenanthos detmoldii*.

### **Conservation Status**

Priority 1

### **Known Populations**

| Population       | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Scott River Rd | SWC      | AMR   | Shire       | 30.10.97    | 13            | poor      |

### **Response to Disturbance**

Unknown

### **Susceptibility to *Phytophthora* Disease**

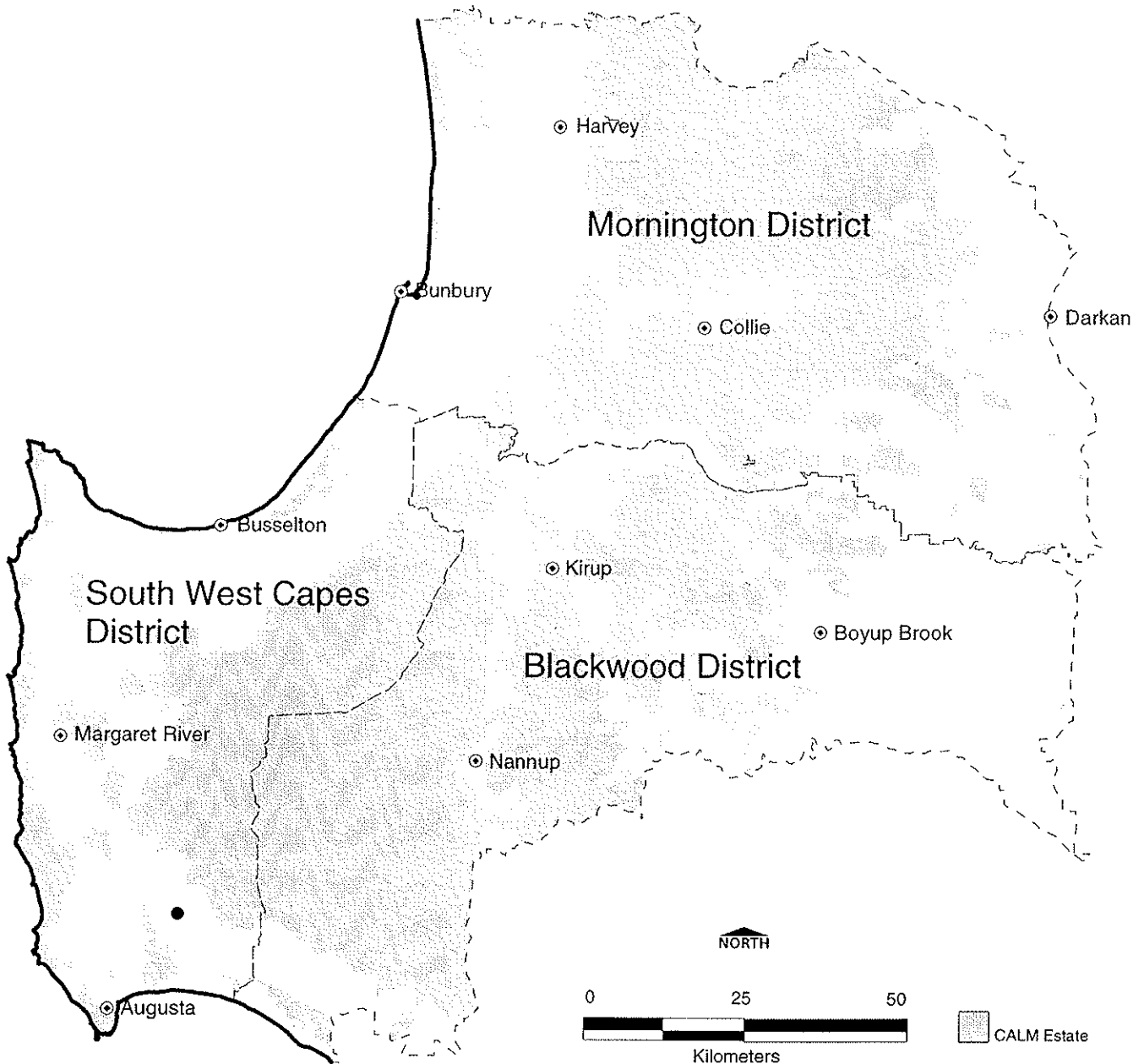
Unknown

### **Management Requirements**

1. Further surveys to determine range of species.

### **Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● **Synaphea nexosa**

## *Synaphea otio stigma* A.S. George

## PROTEACEAE

Decumbent to erect shrub to ca. 30 cm high. Rachis red. Inflorescence erect, greatly exceeding leaves. Flowers bright yellow.

**Flowering Period:** October to November

### **Distribution and Habitat**

Occurs in jarrah/marri forests south and west of Nannup over lateritic soils.

### **Conservation Status**

Priority 1

### **Known Populations**

| Population     | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Jalbarragup  | BWD      | NAN   | SF          | 21.10.93    | -             | -         |
| 2 Vasse Hwy    | BWD      | NAN   | PP          | 21.10.93    | -             | -         |
| 3 Brockman Hwy | BWD      | NAN   | SF?         | 9.11.85     | -             | -         |
| 4 W of Nannup  | BWD      | NAN   | SF          | 23.9.83     | -             | -         |
| 5 S of Nannup  | BWD      | NAN   | -           | 11.11.69    | -             | -         |

### **Response to Disturbance**

Unknown

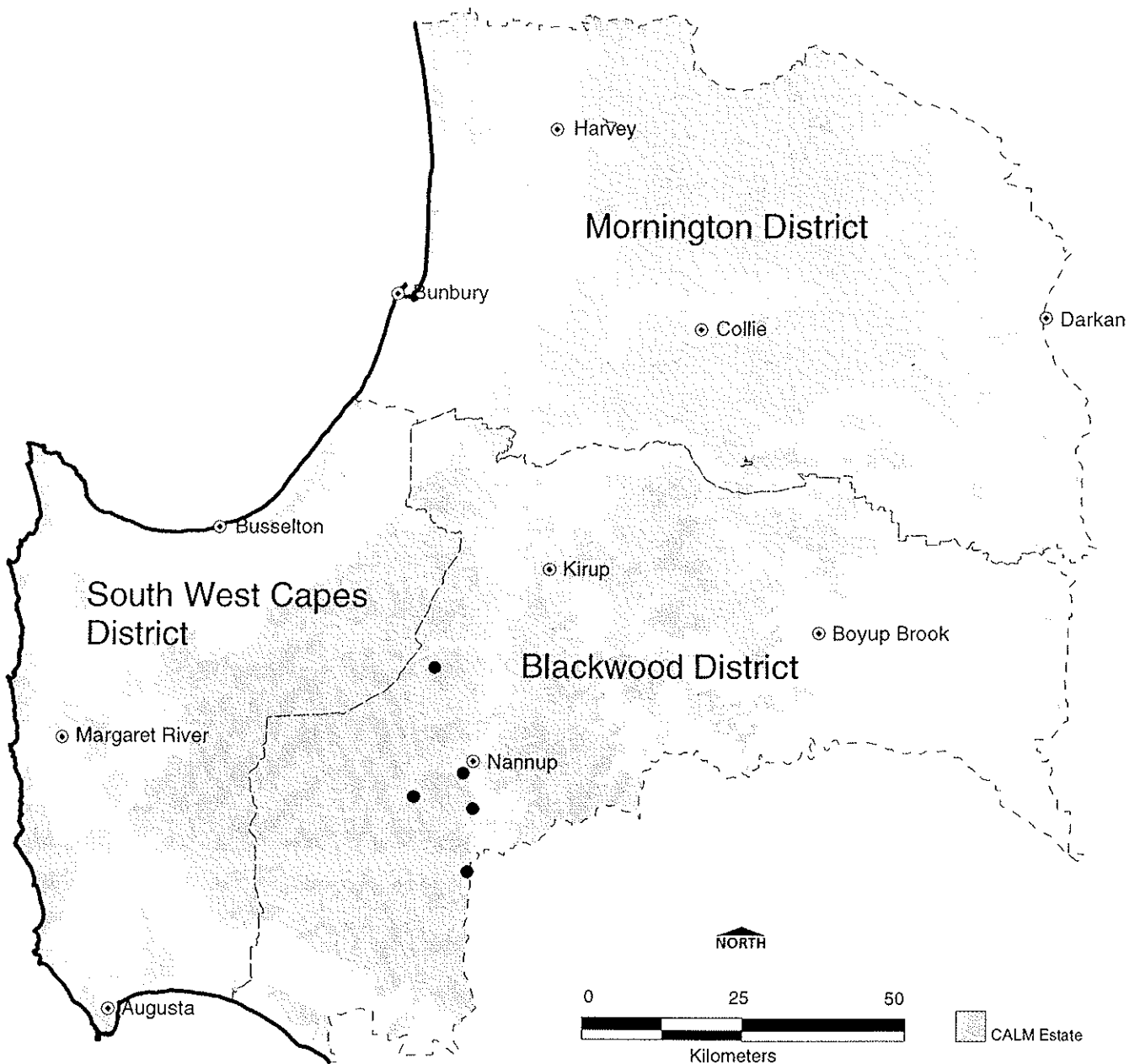
### **Susceptibility to *Phytophthora* Dieback**

Unknown

### **Management Requirements**

### **Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● **Synaphea otio stigma**

## *Synaphea stenoloba* A.S.George

## PROTEACEAE

*Synaphea stenoloba* is a low tufted sprawling shrub without a lignotuber. Stems 2 – 7 cm long, simple or branched, closely pubescent. Leaves tripartite to pinnatipartite, ultimate lobes erect, flat to multiplanar; petiole 2 – 9 cm long, sparsely long-pilose. Inflorescence a spike, 3 – 13 cm long, yellow flowers openly spaced; peduncle 15 – 30 cm long, sparingly branched, glabrous except sparsely appressed-pubescent towards base. Perianth opening widely, glabrous; stigma transversely obovate-elliptic with prominent lobes; ovary sparsely pilose. Fruit obovoid, shortly beaked, and shortly pilose.

**Flowering Period:** August to October

### **Distribution and Habitat**

This species has been recorded near Byford and Elgin. It is found in winter wet areas of grey/brown sandy clay, and in sandy clay over granite.

### **Conservation Status**

Priority 1<sup>#</sup>

### **Known Populations**

| Population   | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Elgin Rd   | SWC      | Cap   | Shire       | 11.8.97     | 0             | very poor |
| 3 Railway Rd | SWC      | Cap   | Road, Rail  | 18.8.97     | 20            | moderate  |

### **Response to Disturbance**

Unknown

### **Susceptibility to Phytophthora Disease**

Unknown

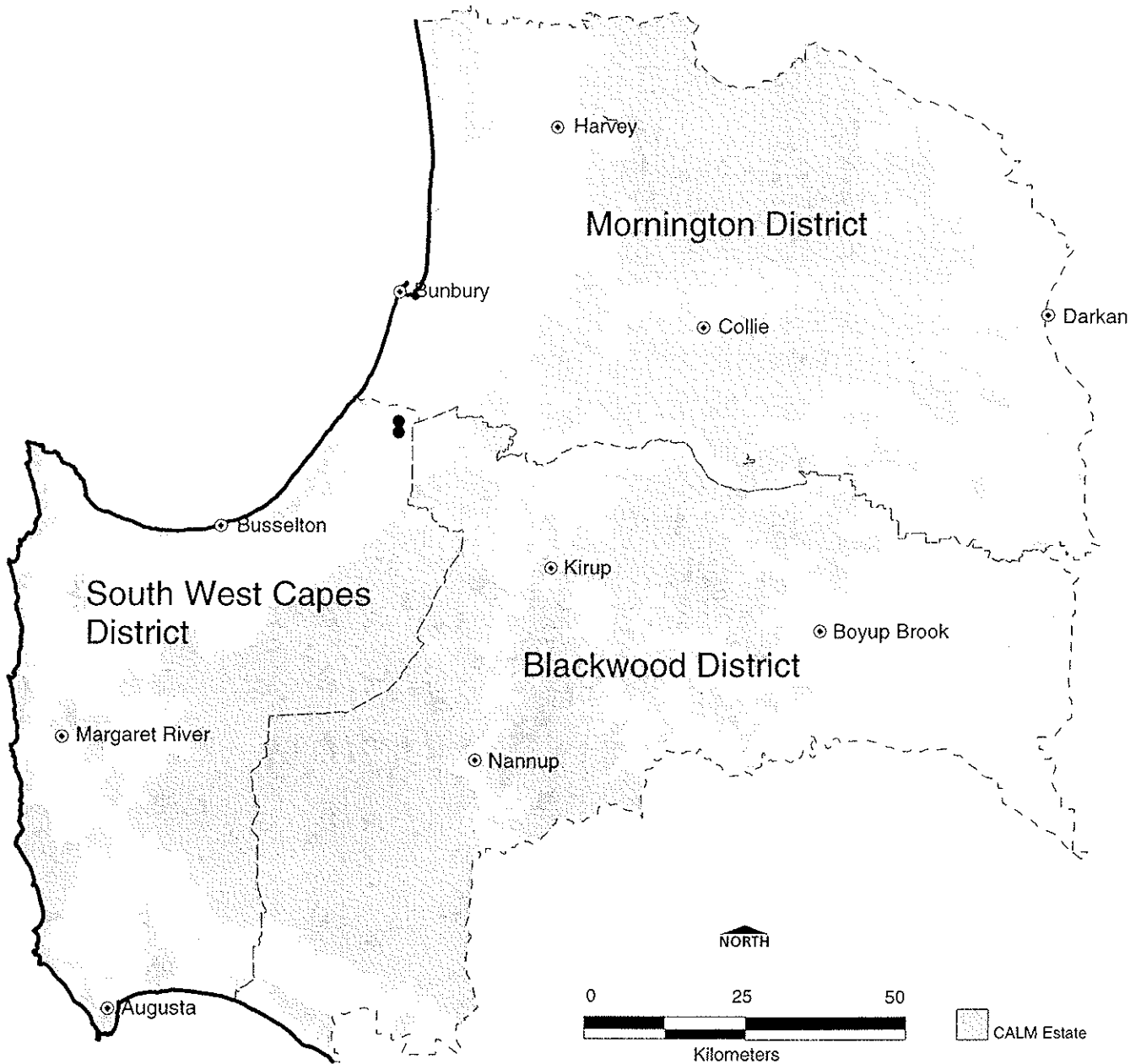
### **Management Requirements**

1. Further surveys to determine range of species

### **Research Requirements**

<sup>#</sup> now Declared Rare Flora (updated at December 1999)

# Central Forest Region Threatened Flora Management Plan



● *Synaphea stenoloba*

*Thomasia laxiflora* Benth.

STERCULIACEAE

Small shrub to ca. 50 cm. Flowers pink to purple

**Flowering Period:** October to November

**Distribution and Habitat**

Occurs on gravelly soils in Jarrah/Marri forest.

**Conservation Status**

Priority 1

**Known Populations**

|   | Population    | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---|---------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 | Sabina Rd     | SWC      | BSN   | SF/Road     | 16.10.97    | occasional    | -         |
| 2 | Whicher Rd    | SWC      | BSN   | SF          | 14.10.97    | loc abundant  | good      |
| 3 | Cowaramup     | SWC      | AMR   | -           | 12.11.46    | -             | -         |
| 4 | Treeton Block | SWC      | BSN   | SF          | 11.11.93    | abundant      | -         |

**Response to Disturbance**

Unknown

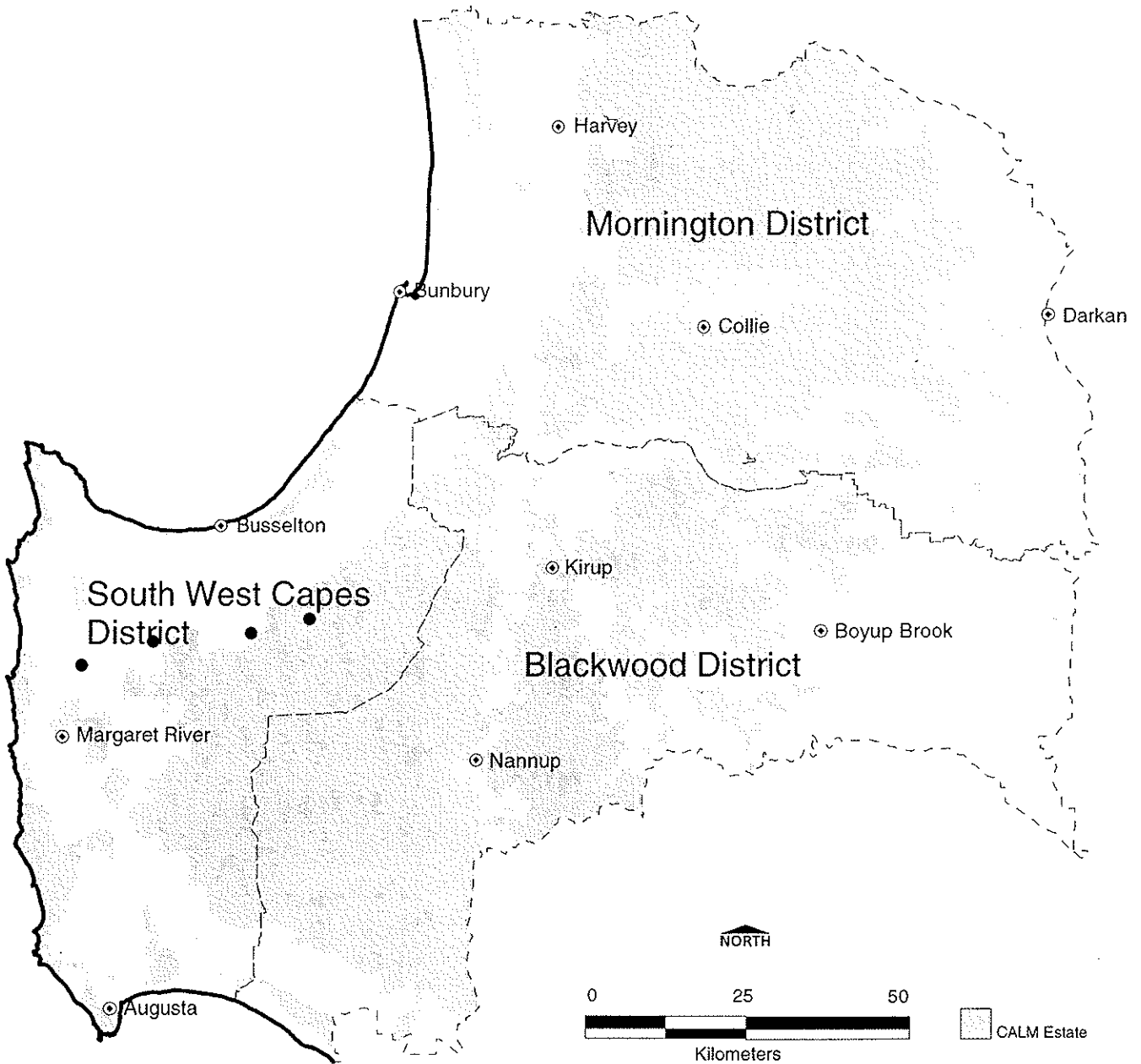
**Susceptibility to *Phytophthora* Disease**

Unknown

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● **Thomasia laxiflora**



## *Thysanotus formosus* Brittan

## ANTHERICACEAE

A perennial herb with a small rootstock and remnants of old leaf bases. Roots tend to be horizontal, are somewhat fleshy, but do not expand into distinct tubers. There are three to four basal leaves about 40 cm long, terete and glaucous. Two to three membranous bracts about 5 cm long enclosing the leaf bases. The scape is usually unbranched, about 30 cm tall and bears 4 - 5 sessile to shortly pedunculate umbels, each of which is 2 - 3-flowered or solitary with several pale purple bracts 5 - 7 mm long. The flower stalks are articulated below the middle but erect in flower and fruit. The perianth segments are 19 mm long, the outer 3 linear-lanceolate with a pointed tip, and the inner 3 elliptical and fringed. The stamens (6), anthers and filaments are dark purple.

**Flowering Period:** January

### **Distribution and Habitat**

Known from six populations all along Brockman Hwy between Augusta and Nannup. This species occurs in low Jarrah/Marri forest, on sandy loams and heavy clay soils, often inundated in winter.

### **Conservation Status**

Priority 1

### **Known Populations**

| Population     | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Brockman Hwy | BWD      | NAN   | SF          | -           | -             | -         |
| 2 Brockman Hwy | BWD      | NAN   | SF          | -           | -             | -         |
| 3 Brockman Hwy | BWD      | NAN   | SF          | 21.2.91     | 22            | -         |
| 4 Brockman Hwy | BWD      | NAN   | SF          | -           | -             | -         |
| 5 Brockman Hwy | BWD      | NAN   | SF          | 11.12.63    | dense pops.   | -         |
| 6 Brockman Hwy | BWD      | NAN   | SF          | 26.1.53     | dense pops.   | -         |

### **Response to Disturbance**

Probably killed by burning

### **Susceptibility to *Phytophthora* Dieback**

Unknown

### **Management Requirements**

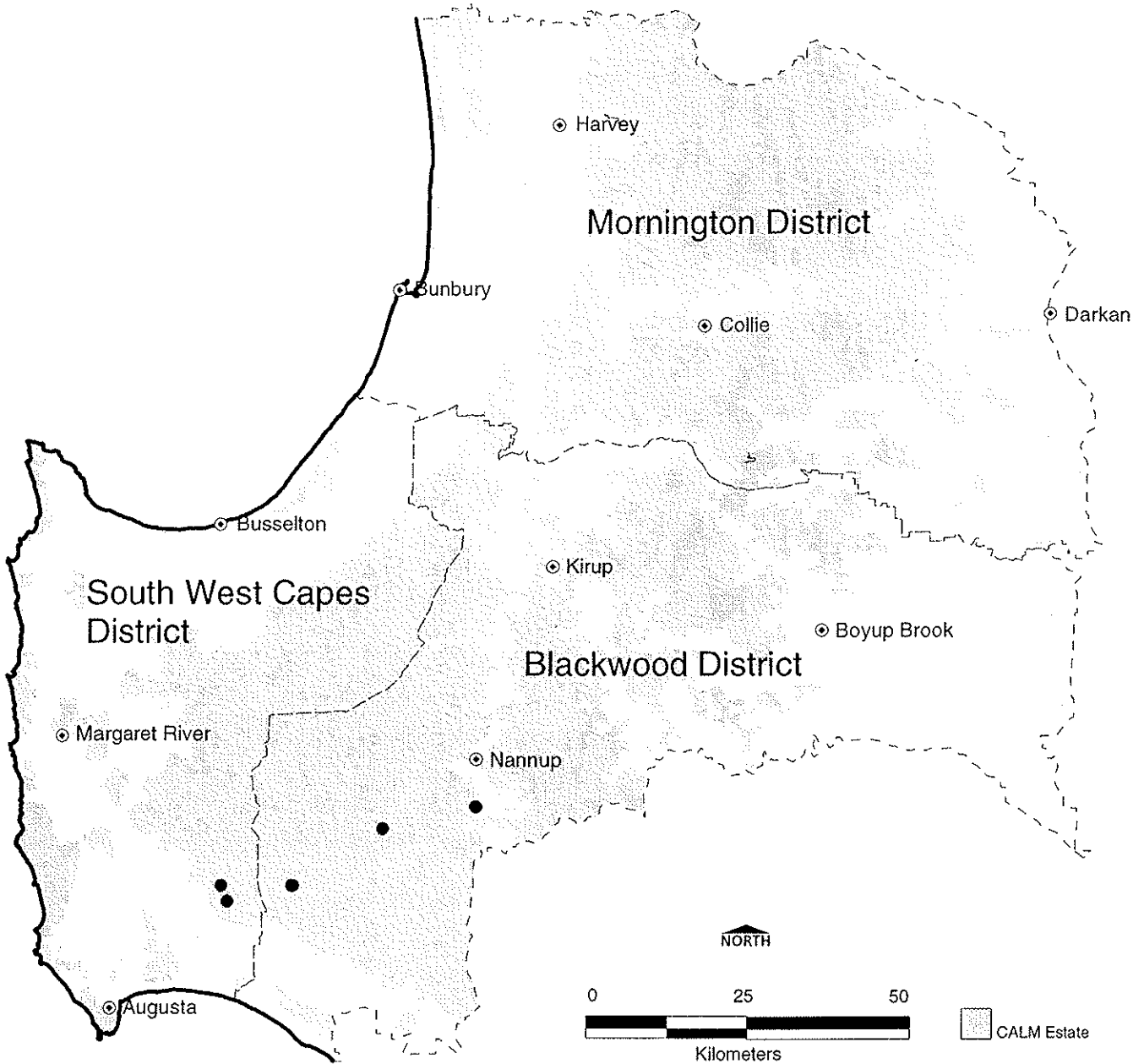
1. Further survey

### **Research Requirements**

### **References**

Brittan, N.H. (1981) Revision of the Genus *Thysanotus* R.Br. (Liliaceae). *Brunonia* 4, 67-181.

# Central Forest Region Threatened Flora Management Plan



● **Thysanotus formosus**

## PRIORITY 2 TAXA

## *Acacia mooreana* W. Fitzg.

## MIMOSACEAE

*Acacia mooreana* is a slender, erect shrub to 0.6 (1) m tall, either single stemmed or moderately divided at the base. Branches are straight and erect, normally sparsely divided, slender yet quite rigid, reddish or brownish. Branchlets have yellow ribs. Stipules are persistent, not prominent and narrowly to very narrowly triangular. The phyllodes are triangular and variable (3) 4-6 (9) mm long x (3) 4-7 (12) mm wide, slightly thickened and flat or very slightly undulate. The midvein terminates one tip of the phyllode with a rigid sharp point, 1mm long. The other, more acute tip terminates in a gland. Inflorescences are simple with 1 per node. Peduncles are 2-3 mm long and glabrous. Flower heads are globular with 4 flowers. Calyx lobes prominently acuminate. Bracteoles are sessile with a thickened protrusion on abaxial surface at their extreme base. Legumes are narrowly oblong but curved, to 70 mm long x 3.5-4 mm wide, flat but slightly raised over seeds, hard and brittle, dark grey and black, tapered at both ends and have thickened margins.

*Acacia mooreana* is readily distinguished from *A. biflora* by its acuminate sepals and bracteoles, 4 flowers per head, 1-nerved petals, more obviously nerved branchlets and dark grey to black seed pods.

**Flowering Period:** Begins around June and extends to October.

### Distribution and Habitat

*A. mooreana* occurs in the south-west of Western Australia, in the Central Forest Region, extending from the vicinity of Boyanup to near Karridale. It grows mainly in sandy soil in swamps (or semi-swamps) and along creeks in open-forest dominated by *Eucalyptus marginata* and *Corymbia calophylla*. In places throughout its range the species is a common roadside invader.

### Conservation Status

Priority 2

### Known Populations

| Population          | District | Shire | Land Status | Last Survey | No. of Plants  | Condition |
|---------------------|----------|-------|-------------|-------------|----------------|-----------|
| 1 Capel River       | SWC      | CAP   | -           | 1.6.1903    | -              | -         |
| 2 W of Donnybrook   | SWC      | CAP   | -           | 9.6.70      | uncommon       | -         |
| 3 Bussel Hwy        | SWC      | AMR   | -           | 1970        | -              | -         |
| 4 Donnybrook        | SWC      | CAP   | -           | 9.12.75     | -              | -         |
| 5 Sabina Rd         | SWC      | BSN   | -           | 3.9.72      | -              | -         |
| 6 Blackwood River   | BWD      | AMR   | -           | 3.1.71      | -              | -         |
| 7 Steward Rd        | BWD      | NAN   | -           | 30.8.75     | -              | -         |
| 8 Argyle            | BWD      | DBK   | -           | 1.6.29      | -              | -         |
| 9 Between Busselton | SWC      | AMR   | -           | 13.9.62     | -              | -         |
| 10 Nannup           | BWD      | NAN   | -           | 11.8.86     | common         | -         |
| 11 Vasse            | SWC      | BSN   | -           | 11.8.86     | scattered      | -         |
| 12 Whicher Range    | SWC      | BSN   | -           | 28.7.85     | common         | -         |
| 13 Nannup           | BWD      | NAN   | -           | 20.7.52     | -              | -         |
| 14 Yallingup        | SWC      | BSN   | -           | 13.8.80     | locally common | -         |
| 15 Alexander Bridge | SWC      | AMR   | -           | 13.8.80     | common         | -         |
| 16 Yallingup        | SWC      | AMR   | -           | 12.8.80     | rare           | -         |
| 17 Whicher Rd       | SWC      | AMR   | -           | 15.5.80     | 1              | -         |
| 18 Steward Rd       | BWD      | NAN   | -           | 30.8.75     | 2000+          | -         |
| 19 Donnybrook       | SWC      | CAP   | -           | 13.10.92    | -              | -         |
| 20 Blythe Rd        | SWC      | BSN   | -           | 20.11.91    | -              | -         |
| 22 Near Donnybrook  | SWC      | CAP   | -           | 9.12.75     | uncommon       | -         |
| 23 KELLY01          | BWD      | CAP   | -           | -           | -              | -         |
| 24 YALL01           | SWC      | BSN   | -           | -           | -              | -         |
| 25 CARB01           | SWC      | BSN   | -           | -           | -              | -         |

### Response to Disturbance

Common on disturbed roadsides within its range.

**Susceptibility to *Phytophthora* Dieback**  
Unknown

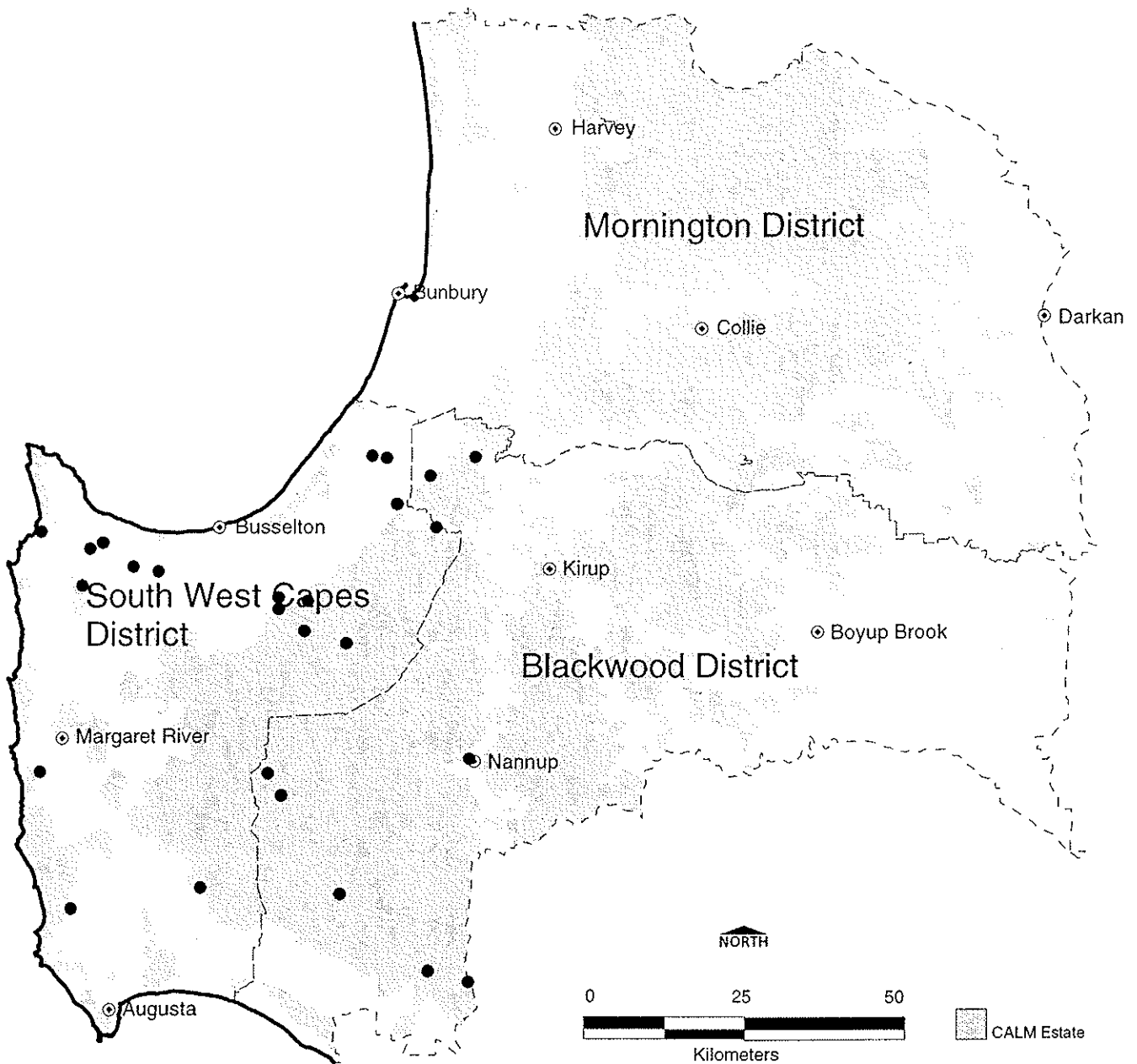
**Management Requirements**

**Research Requirements**

**References**

Maslin, B.R. (1978) Studies in the genus *Acacia* (Mimosaceae)-8 A revision of the Uninerves-Triangulares, in part (the tetramerous species). *Nuytsia* 2, 266-333.

# Central Forest Region Threatened Flora Management Plan



● **Acacia mooreana**

*Acacia oncinophylla* Lindl. subsp. *patulifolia* R.S. Cowan & Maslin

MIMOSACEAE

*Acacia oncinophylla* subsp. *patulifolia* ms is an open, resinous shrub 1-2.5 m tall by up to 2.5 m wide, with minnie-ritchie bark (peeling in thin, longitudinal strips). The branchlets are blue-green and lightly white frosty-powdery coated. Phyllodes are linear-oblongate, 4-9 cm long x 3-6 mm wide, semi-rigid with the tip abruptly rounded off. There are three main veins in the phyllode, the midvein finishes in a sharp point at the apex of the phyllode. The stalk of the flower spike is 4-8 mm long. The bract at the base of the flower stalk is smooth or sparsely hairy. Spikes are 15-25 mm long and 75-97-flowered.

*A. oncinophylla* subsp. *patulifolia* ms differs from *A. oncinophylla* subsp. *oncinophylla* in that it has relatively shorter, broader phyllodes. *A. oncinophylla* subsp. *oncinophylla* has distinctively smooth branchlets and the flower spikes are smaller, 11-13 mm long and 50-60 flowered.

**Flowering Period:** August to September, mature seed pods have been collected in November.

**Distribution and Habitat**

Restricted to Gosnells in the Darling Scarp near Perth in the Swan Region and from near Pinjarra south to Wagerup in the Central Forest Region. It grows mostly in granitic or lateritic soil in open woodland.

**Conservation Status**

Priority 2

**Known Populations**

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Wagerup  | MON      | HVY   | -           | 22.11.92    | -             | -         |

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

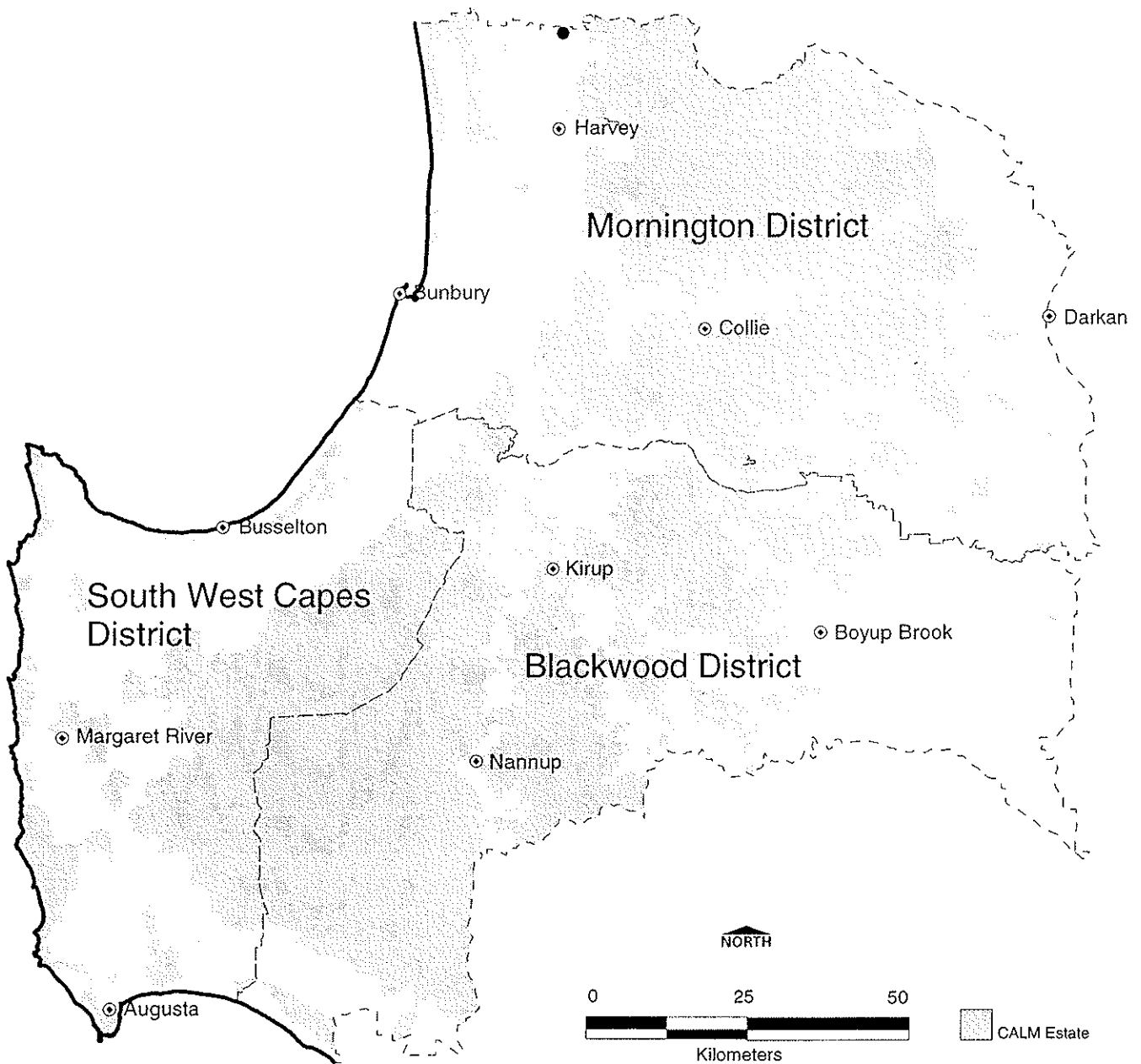
**Management Requirements**

**Research Requirements**

**References**

Cowan, R.S. and Maslin, B.R. (1995) *Acacia* Miscellany 10. New taxa and notes on previously described taxa of *Acacia*, mostly section *Juliflorae* (Leguminosae: Mimosoideae), in Western Australia. *Nuytsia* 10, 15-62.

# Central Forest Region Threatened Flora Management Plan



● *Acacia oncinophylla* subsp. *patulifolia* ms



## *Acacia subracemosa* Maslin

## MIMOSACEAE

A tall, spreading, dense shrub, 2-3 m (up to 5m) high with smooth, grey to light brown bark. Branches are finely ribbed and have short, dense, rigid hairs. The stipules (leaf like structures at the base of the petiole) prominent on young shrubs, are narrowly triangular and 2-4.5 mm long. Leaves are bipinnate with hairiness as on branches. The leaflets are dark green above and pale green below. The inflorescence is a short, axillary raceme, bearing 2-4(6) flower heads. The main stalk of the raceme is normally less than 1 mm long. Flower stalks are 7-17 mm long and have moderately dense rigid hairs. Flower heads are cream coloured, round, 5-6 mm in diameter in full bloom with each head consisting of 15-20 loosely arranged, 5-merous flowers. The seed pods are narrowly oblong, 15-40 x 4-6 mm, flat, raised over seeds, sparsely hairy and dark to medium brown.

**Flowering Period:** Recorded flowering from September to December.

### Distribution and Habitat

*A. subracemosa* occurs in the south-west of Western Australia, in a restricted area from the vicinity of Augusta northward to near Witchcliffe. This species appears to grow only on red to yellow-brown sand over limestone in Karri forest

### Conservation Status

Priority 2

### Known Populations

| Population     | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 NW Karridale | SWC      | AMR   | -           | 29.9.83     | uncommon      | -         |
| 2 Boranup      | SWC      | AMR   | -           | 5.10.76     | -             | -         |
| 3 Mammoth Cave | SWC      | AMR   | -           | 8.6.72      | -             | -         |
| 4 Boranup      | SWC      | AMR   | -           | 4.11.87     | -             | -         |

### Response to Disturbance

Killed by fire, regenerates prolifically from seed.

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

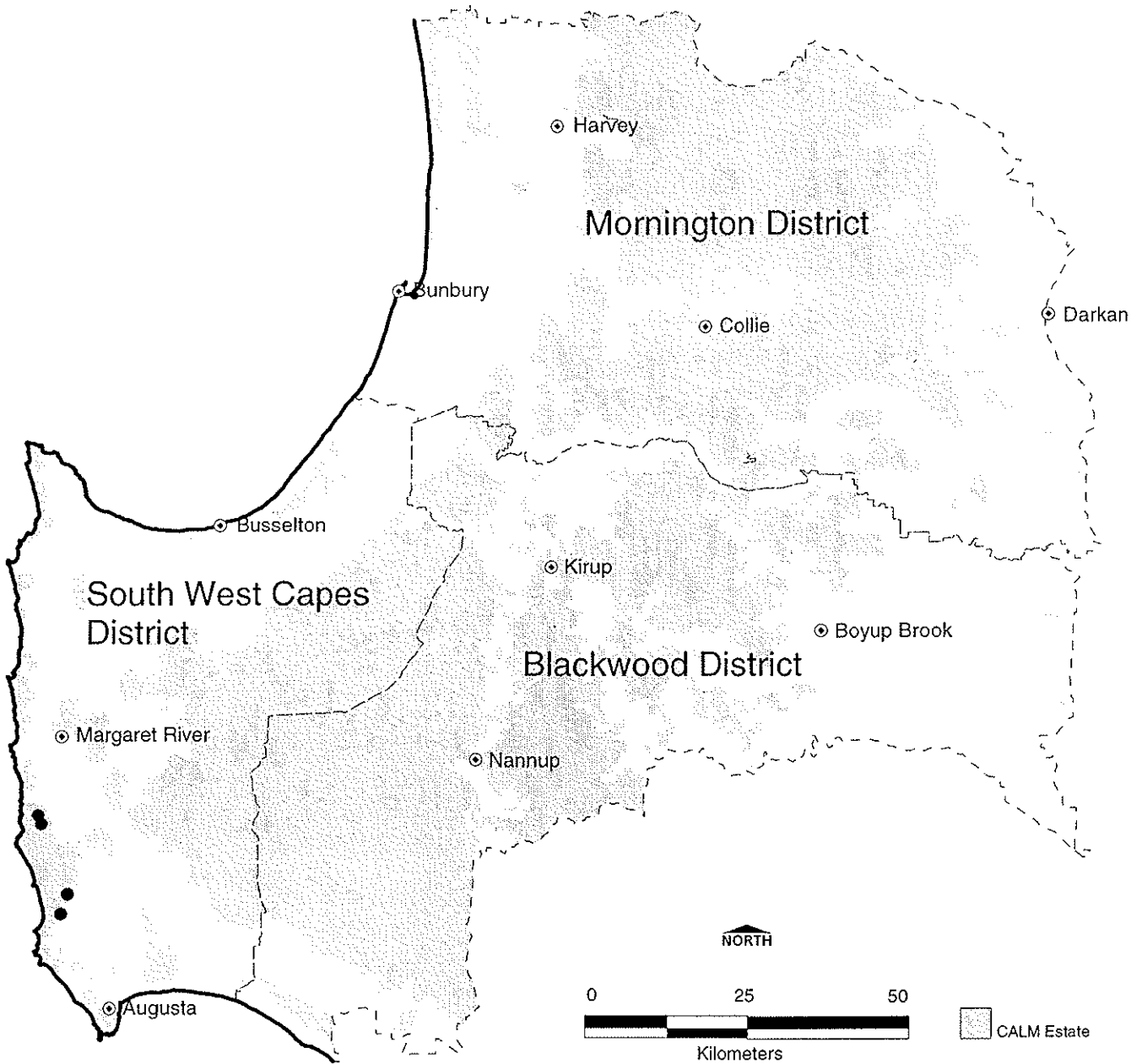
Very common in Boranup Forest, no known current threats

### Research Requirements

### References

Maslin, B.R. (1975) Studies in the genus *Acacia* (Mimosaceae)-4. A Revision of series Pulchellae. *Nuytsia* 1, 388-494.

# Central Forest Region Threatened Flora Management Plan



● ***Acacia subracemosa***

## *Actinotus whicheranus* Keighery

## APIACEAE

An erect slender shrub with erect flowering branches to 40 cm tall. Stems are slender and pubescent when young, becoming glabrous with age. Leaves are alternate, pubescent when young and petiole is 25 to 55 mm long. The lamina has three to four primary lobes and with secondary lobes 20 to 25 mm long, green on upper surface and grey-green underneath. Inflorescence is 15 to 35 mm diameter and subtended by a linear leaf-like bract 3 to 6 mm long. Peduncle is 5 to 8 cm long, with numerous flowers, glabrous. Flowers are white and 2 mm long (Keighery, 1999).

**Flowering Period:** December to March

### Distribution and Habitat

*A. whicheranus* is confined to Whicher Range, where it is found on white leached sands. It is well represented in the proposed Whicher Range Nature Reserve. It grows with *Banksia attenuata* in low open woodland over heath and *Beaufortia squarrosa* shrubland.

### Conservation Status

Priority 2

### Known Populations

| Population      | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Sabina Road A | SWC      | BSN   | SF          | 15.11.96    | 100+          | good      |
| 2 Sabina Road B | SWC      | BSN   | SF          | 7.1.97      | -             | good      |

### Response to Disturbance

May survive mild winter fires but is killed by summer fires, regenerating from seed.

### Susceptibility to *Phytophthora* Dieback

Probably not susceptible.

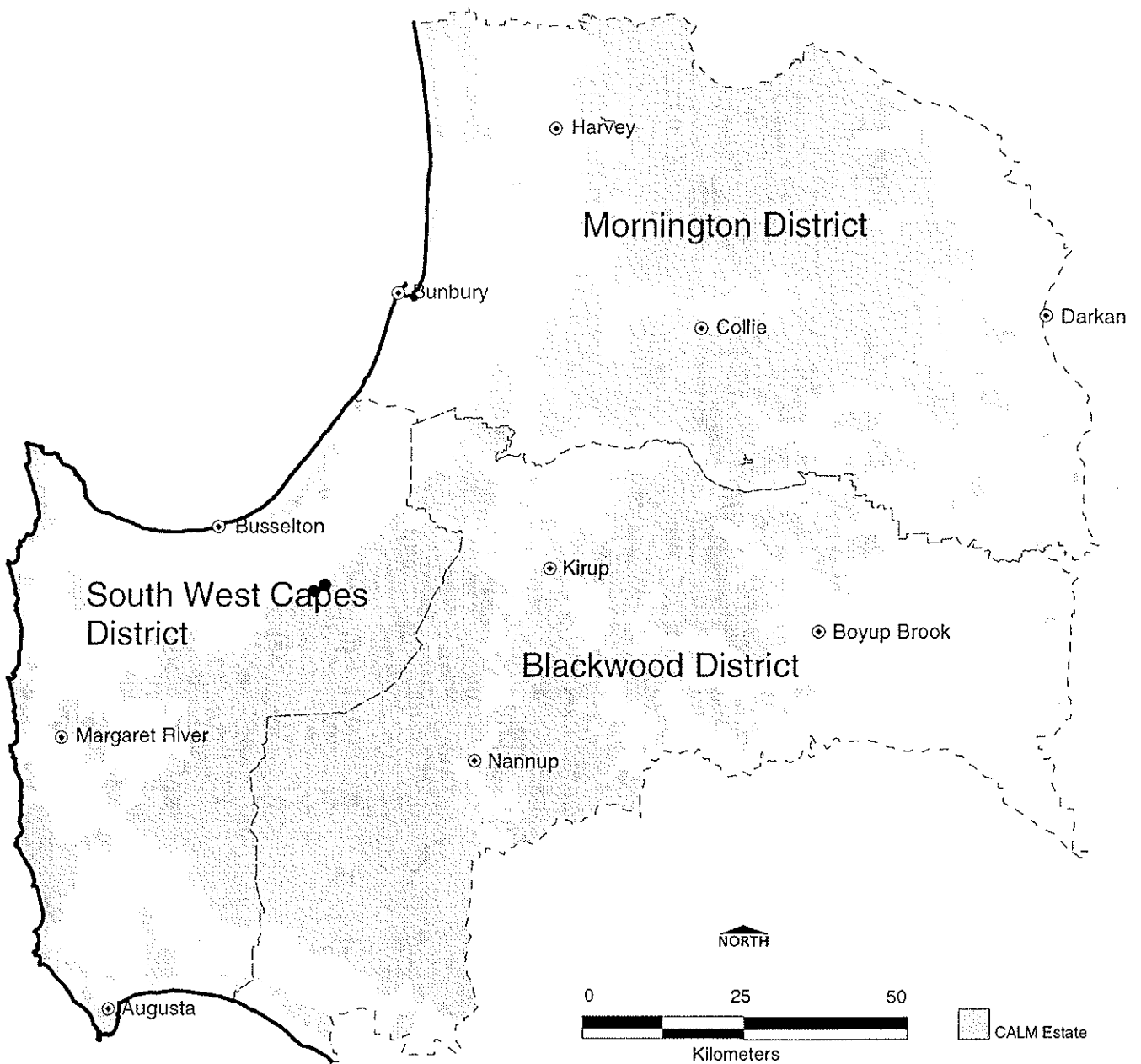
### Management Requirements

### Research Requirements

### References

Keighery, G.J. (1999) Two new species of *Actinotus* (Apiaceae) from Western Australia. *Nuytsia* 13, 23-27.

# Central Forest Region Threatened Flora Management Plan



● **Actinotus whicherae ms**

## *Amperea micrantha* Benth.

## EUPHORBIACEAE

A bushy small shrub, nearly prostrate, rhizomatous perennial 10 to 20 cm high and 10 to 30 cm across. Stems are branched, smooth and sulcate distally. Leaves are alternate along stems with more clustered on short branchlets in their axils, shortly petiolate. Stipules ovate or narrowly triangular to deltoid, greenish to reddish brown, with numerous long marginal cilia. Flowers clustered in axils of most stem leaves and leaves on condensed axillary branchlets. *Amperea micrantha* is distinguished from other species by its entire leaf margins that are revolute to midrib and has acute tips.

**Flowering Period:** September to October

### **Distribution and Habitat**

Found in sandy laterite soils in the Proposed Whicher Range Nature Reserve and Yoongarillup in the Busselton Shire. It is also known from the Mokine Nature Reserve in the Swan Region.

### **Conservation Status**

Priority 2

### **Known Populations**

| Population      | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Sabina Rd     | SWC      | BSN   | -           | 16.9.68     | -             | -         |
| 2 Yoongarillup  | SWC      | BSN   | -           | 30.9.53     | -             | -         |
| 3 Whicher Range | SWC      | BSN   | Prop NR     | -           | -             | -         |

### **Response to Disturbance**

Unknown

### **Susceptibility to *Phytophthora* Dieback**

Unknown

### **Management Requirements**

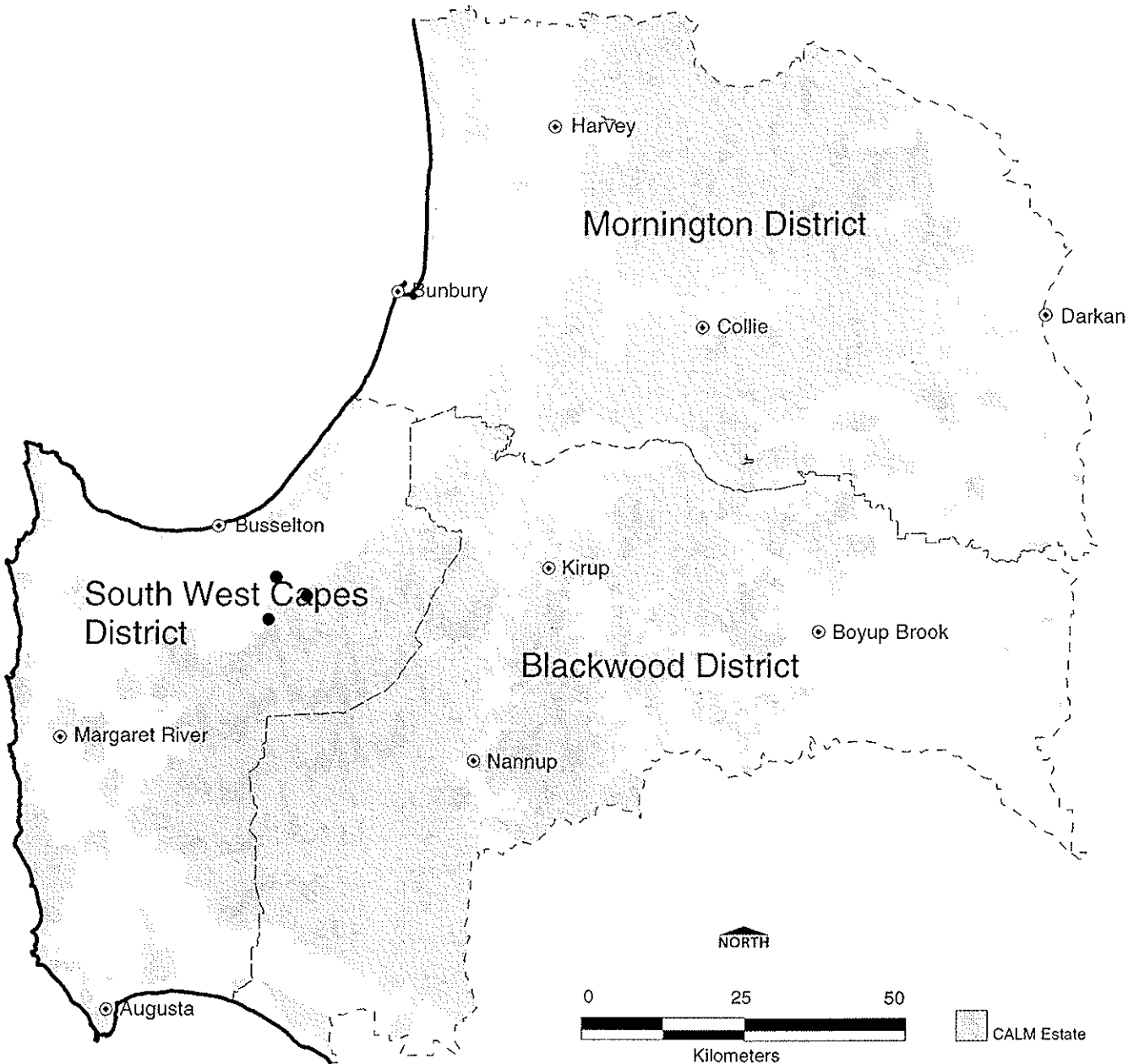
### **Research Requirements**

Further surveys to determine definite population locations within the proposed Whicher Range Nature Reserve.

### **References**

- Bentham, G. (1873) *Flora Australiensis: a description of the plants of the Australian Territory*. Vol 6, (Thymeleae to Dioscorideae), p83.
- Henderson, R.J.F. (1992) Studies in Euphorbiaceae A.L. Juss., sens. Lat. I. A revision of *Amperea* Adr. Juss. (Acalyphoideae Ascherson, Ampereae Muell. Arg.). *Australian Systematic Botany* 5, 1-27.

# Central Forest Region Threatened Flora Management Plan



● *Amperea micrantha*

## *Amperea protensa* Nees

## EUPHORBIACEAE

A small shrub to about 30 cm tall, with a woody rootstock and numerous, slender, diffuse stems. The alternating, oblong-lanceolate leaves are contracted into a petiole and are flat or almost so. Stipules are broad and deeply fringed. The flowers are green in small, axillary clusters with usually one female flower surrounded by a few male flowers. The female flowers are sessile with the whole flower divided to the base into five segments. The male flowers have a pedicel and are divided almost to the middle into three lobes. The fruit is a capsule with erect appendages at the apex. Unlike *A. volubilis*, *A. protensa* does not appear to twine around adjacent vegetation.

**Flowering Period:** November to January

### Distribution and Habitat

*Amperea protensa* has been recorded from the Scott Plains and Blackwood River valley to the north. On the Scott Plain, the species occurred under *Melaleuca/Banksia* low open woodland over shrubs along a creekline on black peaty soil. Associated species included *Banksia littoralis*, *Eucalyptus megacarpa*, *Agonis flexuosa*, *Astartea fascicularis*, *Callistachys lanceolata* and *Lepidosperma gladiatum*. It is also recorded from Perth in the Swan Region, Walpole in the Southern Forest Region and Albany in the South Coast Region. Near Walpole, the species has been recorded from swampy sedgeland flats.

### Conservation Status

Priority 2

### Known Populations

| Population    | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Scott River | SWC      | AMR   | NP          | 15.3.91     | 50            | disturbed |
| 2 Few Rd      | SWC      | AMR   | SF          | 16.11.92    | -             | -         |
| 3 Denny Rd    | SWC      | AMR   | SF          | 16.11.92    | -             | -         |

### Response to Disturbance

Several plants were killed by a bulldozer scrape.

### Susceptibility to *Phytophthora* Dieback

Resistant.

### Management Requirements

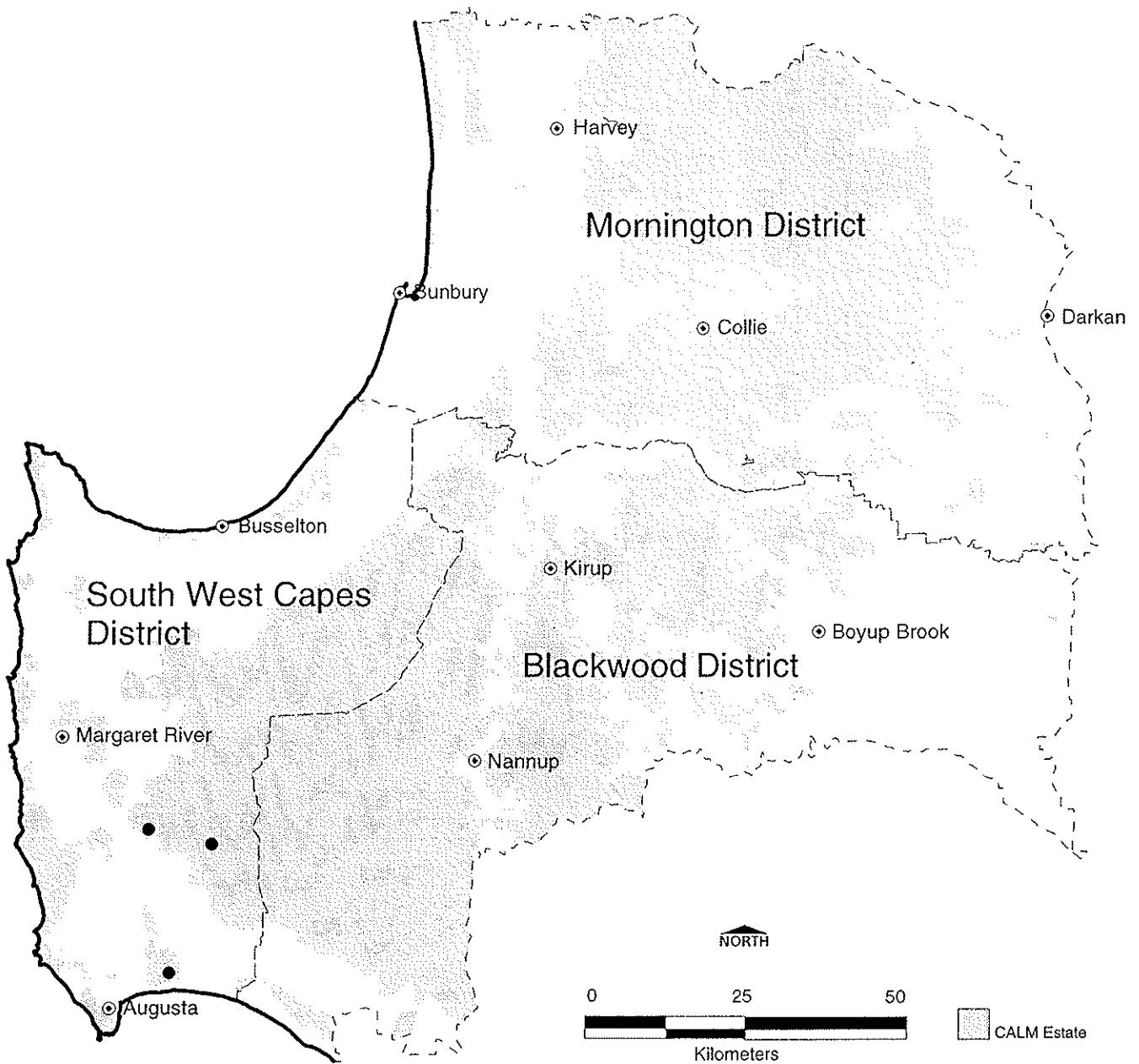
### Research Requirements

Survey to confirm whether populations in the Scott River refer to the same site.

### References

Bentham, G. (1873) *Flora Australiensis: a description of the plants of the Australian Territory*. Vol 6, (Thymeleae to Dioscorideae), p82.

# Central Forest Region Threatened Flora Management Plan



● *Amperea protensa*



## *Andersonia auriculata* L. Watson

## EPACRIDACEAE

*Andersonia auriculata* is a small shrub to 20 cm in height. It has an ascending habit (at its base it arches up, becoming erect in the upper part)

Leaves are 5-15 mm long x 1-3 mm wide at the base, lanceolate-acuminate, twisted, undulate and spreading. Sepals are 10-17 mm long, lanceolate, sometimes finely hairy and greenish white. The petals are shorter than the calyx and white or blue. Petals are about twice as long as the tube. The stamens are 1/2 the length of the corolla, exceeding the tube. Stamen filaments are flattened and bear a pair of earlike, tufted appendages below the mid point of the filament.

*Andersonia auriculata* is similar in appearance to some forms of *A. caerulea*, but can be distinguished by its petals being twice as long as the tube and the staminal filament appendages.

**Flowering Period:** July

### **Distribution and Habitat**

*Andersonia auriculata* was recorded from one population in the Central Forest Region, at Nannup. It was found in white sand in woodland. Other populations occur in the Southern Forest Region at Quarram, Bow River and west of Denmark. The Denmark populations are found in a range of associated vegetation eg. *Allocasuarina fraseriana* woodland, *Agonis parviceps*, *Adenanthos obovatus*, *Banksia attenuata* and *Melaleuca thymoides*; *Banksia* woodland and *Eucalyptus marginata* woodland.

### **Conservation Status**

Priority 2

### **Known Populations**

| Population     | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Blackwood Rd | BWD      | NAN   | SF          | 9.1.97      | -             | -         |

### **Response to Disturbance**

Has recovered from roadside grading and seedlings established within two years of burning.

### **Susceptibility to *Phytophthora* Dieback**

Possibly affected by dieback. Some plants have been seen to recover. *A. auriculata* could be naturally seasonal.

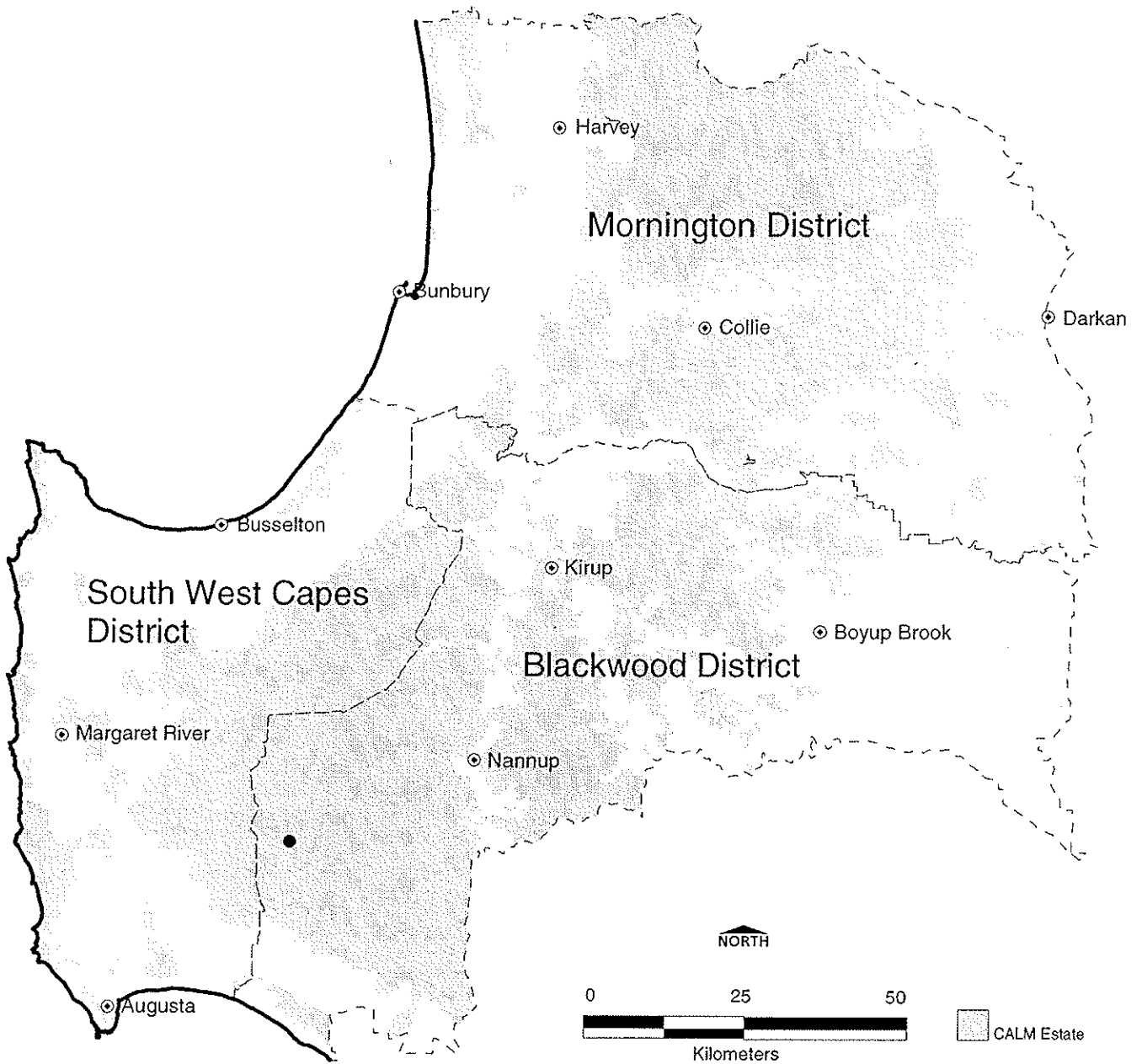
### **Management Requirements**

### **Research Requirements**

### **References**

Watson, L. (1962) A taxonomic revision of the genus *Andersonia* R.Br. (Epacridaceae). Kew Bulletin 6, 85-127.

# Central Forest Region Threatened Flora Management Plan



● ***Andersonia auriculata***

*Apodasmia ceramophila* L.A.S. Johnson & B.G. Briggs ms

RESTIONACEAE

Rhizomatous rush with male and female parts, 0.1 - 0.3 m high and 0.5 m wide. Flowers brown.

**Flowering Period:** September to October

**Distribution and Habitat**

Occurs in the Central Forest Region at Yarloop on sandy soil, Cookernup on heavy clay soil and east of Collie on a swampy ridge over brown sandy-clay. Associated vegetation includes *Melaleuca*, *Kunzea* and *Leptocarpus canus*. Also occurs at Lake Muir in the Southern Forest Region.

**Conservation Status**

Priority 2

**Known Populations**

| Population  | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Cookernup | MON      | HVY   | -           | 22.9.66     | frequent      | -         |
| 2 Yarloop   | MON      | HVY   | -           | 14.10.47    | -             | -         |
| 3 Collie    | MON      | COL   | -           | 30.10.97    | frequent      | -         |

**Response to Disturbance**

Unknown

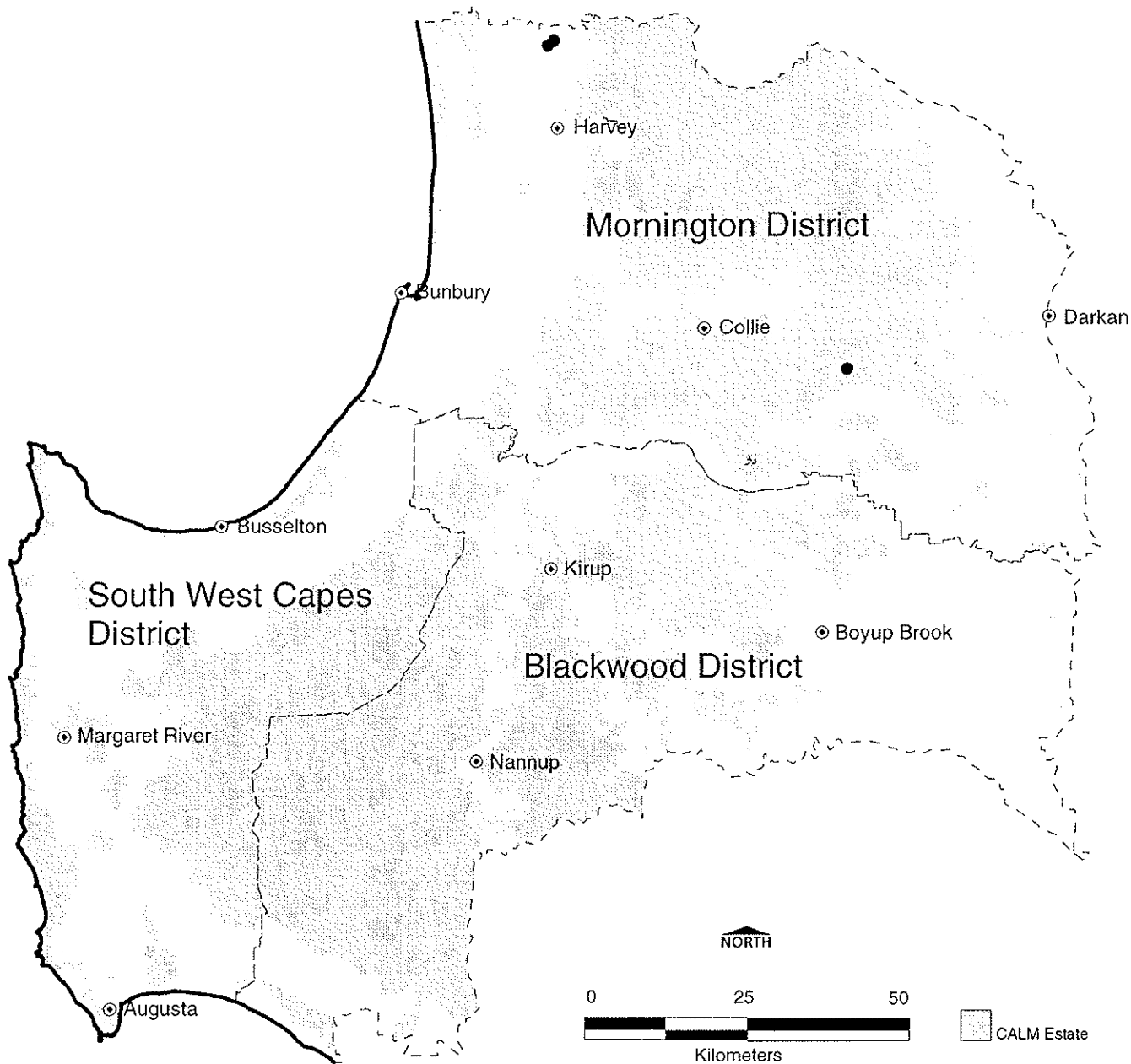
**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● *Apodasmia ceramophila ms*

*Boronia capitata* Benth. subsp. *gracilis* Paul G. Wilson

RUTACEAE

Erect, multistemmed, compact plant (some specimens twiggy and open) to 50 cm tall by 40 cm wide. Flowers light pink to magenta.

**Flowering Period:** June to August

**Distribution and Habitat:**

Found only in the Central Forest Region of W.A. at Harvey, Busselton and Yarloop. The Yarloop population was found growing on edge of swamp in white sand.

**Conservation Status**

Priority 2

**Known Populations**

| Population      | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1a W of Harvey  | MON      | HVY   | -           | 24.4.97     | -             | -         |
| 1b W of Harvey  | MON      | HVY   | -           | 14.10.97    | loc abundant  | -         |
| 1c W of Harvey  | MON      | HVY   | -           | 18.6.70     | -             | -         |
| 3 Jindong       | SWC      | BSN   | -           | 20.10.53    | -             | -         |
| 4 Yarloop       | MON      | HVY   | -           | 28.8.78     | -             | -         |
| 5a Yelverton SF | SWC      | BSN   | SF          | 8.11.89     | -             | -         |
| 5b Yelverton SF | SWC      | BSN   | SF          | 5.10.90     | -             | -         |
| 6 Black Swamp   | SWC      | BSN   | -           | 3.10.53     | -             | -         |

**Response to Disturbance**

Unknown

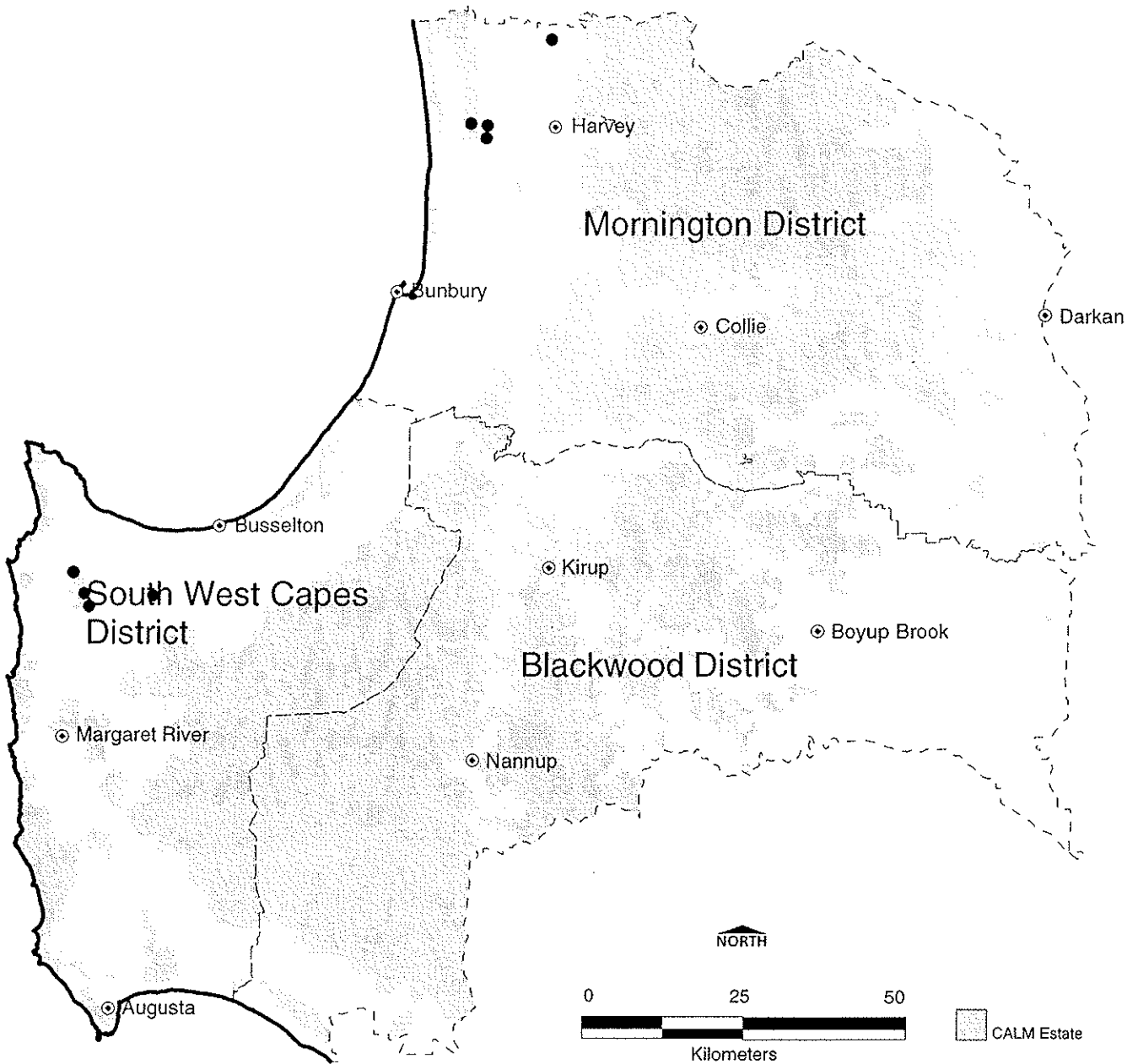
**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● *Boronia capitata subsp. gracilis*

## *Caladenia abbreviata* Hopper & A.P. Brown ms

## ORCHIDACEAE

*Caladenia abbreviata* has a single, hairy leaf 10 - 20 cm long x 8 mm wide, which is often withered when flowering. Each plant has between one and three flowers on a stem to 20 cm high. The petals and sepals are pale yellow (rarely dark red). Petals are horizontal to downcurved, 2.5 - 5 cm long x 2 - 3 mm wide. The labellum (inner floral lip like segment) is 10 - 13 mm long x 7 - 9 mm wide, has thick dark radiating basal lines which become large irregular spots and blotches towards the recurved tip. Calli (wart like structures on the labellum) are in 8 - 13 pairs extending at least half the length of the labellum.

The above attributes distinguish *C. abbreviata* from other short tepalled species in the *C. filamentosa* complex, such as *C. dorrieni*. *C. abbreviata* is most similar to *C. evanescans*, both being late flowering south coastal species, but *C. evanescans* differs in having white flowers with shorter petals and sepals, erect petals and a labellum which is thrust outwards rather than evenly recurved.

**Flowering Period:** Late October to December

### Distribution and Habitat

Found between Yallingup and Williams Bay in consolidated coastal dunes, growing on brown sandy loam soil in heath and open low woodlands of Peppermint (*Agonis flexuosa*). Associated species include *Corymbia calophylla* (Marri) *Templetonia retusa* and *Scaevola*.

### Conservation Status

Priority 2

### Known Populations

| Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 S of Cosy Corner | SWC      | AMR   | NP          | 11.11.86    | -             | -         |
| 2 Caves Rd         | SWC      | AMR   | PP          | 11.11.86    | -             | -         |
| 3 E Augusta        | SWC      | AMR   | -           | 1.11.91     | -             | -         |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown

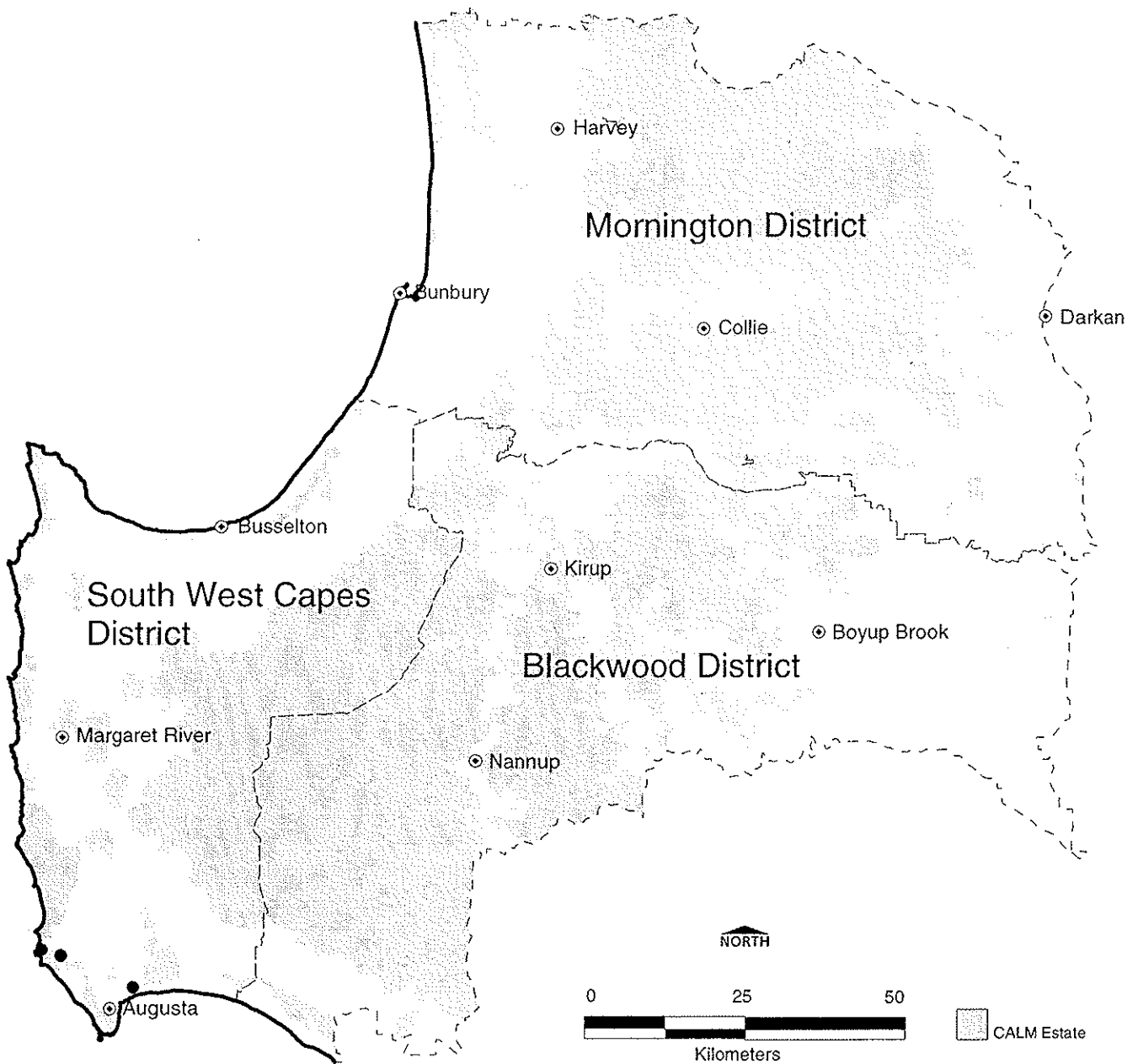
### Management Requirements

### Research Requirements

### References

Hoffman, N. and Brown, A. (1998) *Orchids of South-west Australia*. Revised 2<sup>nd</sup> edition with supplement. University of Western Australia Press, Nedlands.

# Central Forest Region Threatened Flora Management Plan



● **Caladenia abbreviata ms**



*Caladenia caesarea* (Domin.) M.A. Clem. & Hopper subsp. *transiens* Hopper & A.P. Brown ms

ORCHIDACEAE

**Dwarf Mustard Orchid**

This spider orchid was discovered in Williams in 1986. It grows to 20 to 30 cm with narrow leaves 10 to 15 cm long and bearing one to two flowers 8 - 10 cm long and 5 - 6 cm wide which are distinctively pale yellow with thin pale brown veins and a prominently curved labellum. While there are four subspecies of *Caladenia caesarea*, subspecies *transiens* ms is distinguished by its smaller flowers: its lateral sepals are 4 - 4.5 cm long and 1.5 - 2 mm wide; its labellum lamina is 2 - 13 mm long and 7 - 7.5 mm wide; by the even recurving of the labellum apex with flat margins, and by its more northern distribution.

**Flowering Period:** September to October

**Distribution and Habitat**

Two populations have been confirmed. It was first recorded from a small area south of Williams, scattered under dense sheoak thickets amongst low shrubs and dense herbs in sandy-clay soil. However a fire in 1990 killed most of the sheoak and opened the understorey to weed invasion and the species has not been recorded since at this location. It has also been recorded south of Newdegate on shallow soils overlying granite in open mallee of *Eucalyptus gratiae* over tamma heath and *Borya constricta* herbfield.

**Conservation Status**

Priority 2

**Known Populations**

| Population   | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------|----------|-------|-------------|-------------|---------------|-----------|
| 1. Bowelling | MON      | WEA   | -           | 14.9.92     | common        | -         |

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

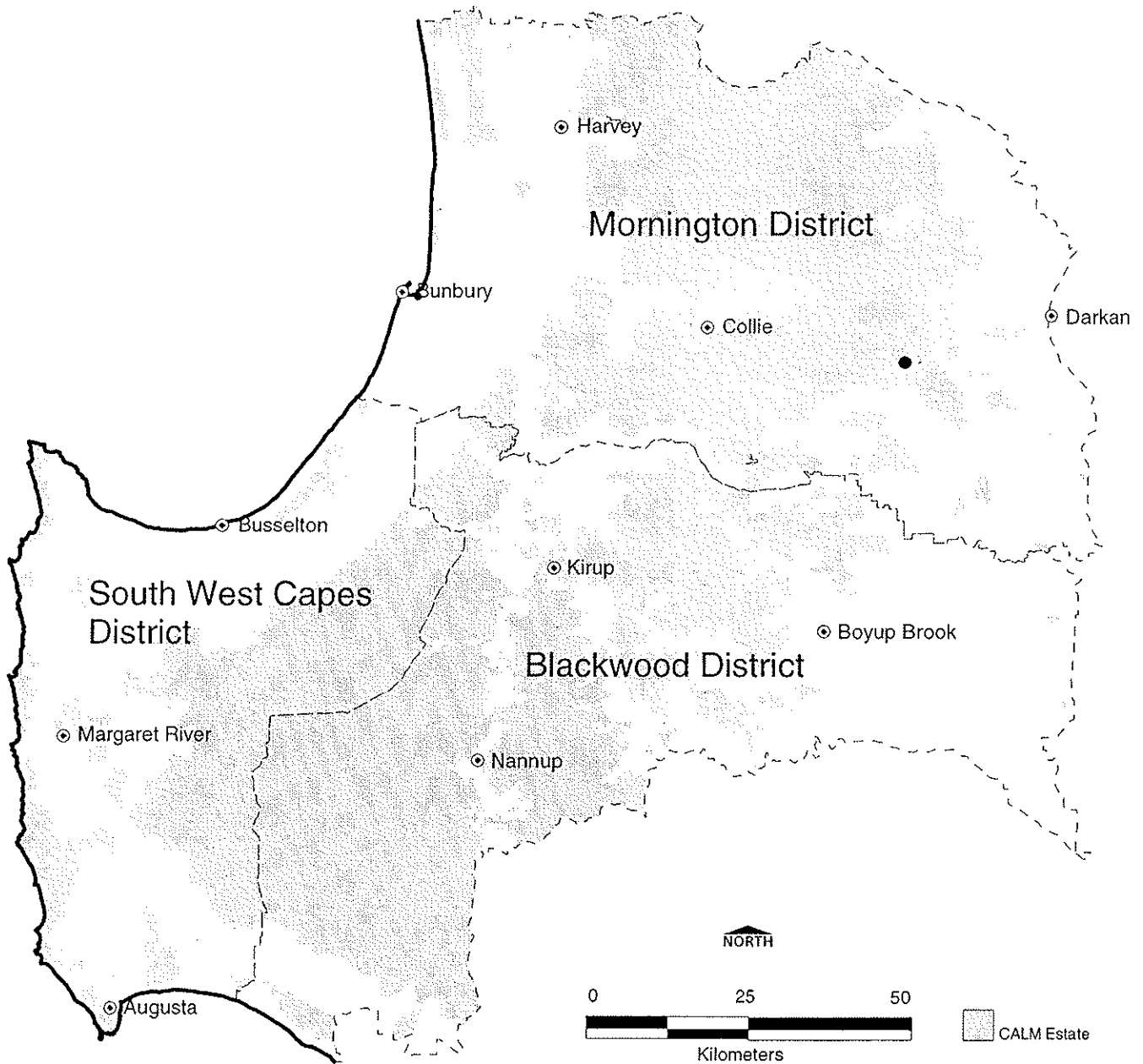
Unknown, however there is no evidence that *Caladenia* species are susceptible.

**Management Requirements**

1. Further survey.
2. Monitor and control weeds where required.

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● *Caladenia caesarea* subsp. *transiens* ms

## *Calothamnus* sp. Scott River (R.D. Royce 84)

## MYRTACEAE

*Calothamnus* sp. Scott River is an erect densely branched, compact shrub to 1.5 m, usually with thick corky branches and prominent leaf scars on old branches. Leaves, crowded on the ends of branches, are sessile, terete, rigid and erect, 5 - 15 cm long. The flowers, dark crimson-red in colour, are borne in dense clusters on areas of the stem where the leaves have fallen. The calyx tube and the fruit are embedded in the swollen corky stem.

This taxon, along with *Calothamnus lateralis* and *C. crassus*, form a poorly defined species complex. *C. crassus* is a compact, thick stemmed, short leaved form found only in the Stirling Range. *C. lateralis*, found from Perth to Albany, is a slender open shrub, with long slender and relatively soft leaves, and flowers in open unilateral spikes. *C. sp. Scott River* has a similar form and dense flowering to *C. crassus*, but has longer leaves similar to *C. lateralis*. Previous publications on this species have referred populations to *C. crassus* (Hawkeswood, 1987, Mattiske *et al* 1990).

**Flowering Period:** October to November

### Distribution and Habitat

*Calothamnus* sp. Scott River has only been recorded from the Scott Plain, in dense heath on red clay over ironstone. Distribution may need to be extended once the additional location from the Swan Coastal Plain Survey is established.

### Conservation Status

Priority 2

### Known Populations

| Population            | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Governor-Broome Rd  | SWC      | AMR   | Shire       | 3.7.97      | 1000's        | good      |
| 2a Brockman Hwy       | SWC      | AMR   | MRD         | 21.2.97     | 100+          | good      |
| 2b Brockman Hwy       | SWC      | AMR   | SF          | 21.2.97     | 50+           | good      |
| 3 Scott River Rd      | SWC      | AMR   | Shire       | 25.2.98     | 100's         | mod       |
| 4 Kohlhagen Road      | SWC      | BSN   | SF, Shire   | -.9.97      | 50+           | mod       |
| 5a Jindong-Treeton Rd | SWC      | BSN   | NR          | 19.6.97     | 100's         | good      |
| 5b Jindong-Treeton Rd | SWC      | BSN   | Shire       | 19.6.97     | 100's         | moderate  |
| 6a Dennis Road        | SWC      | AMR   | Shire       | 3.7.97      | 100's         | good      |
| 6b Dennis Road        | SWC      | AMR   | Shire       | 3.7.97      | 1000's        | good      |
| 7 Beenup              | SWC      | AMR   | PP (BHP)    | 16.12.97    | 1000's        | good      |
| 8 Loc. 4262           | SWC      | AMR   | NR          | 30.10.97    | 100's         | good      |
| 9 Chester Block       | SWC      | AMR   | SF          | 3.7.97      | 1000's        | good      |
| 10 Price Road         | SWC      | BSN   | Shire       | 24.6.97     | 15            | moderate  |

### Response to Disturbance

Population in Chester Block killed by an early summer fire and has regenerated after some time in very large numbers.

### Susceptibility to *Phytophthora* Dieback

Dieback resistant

### Management Requirements

1. Regular Survey
2. Investigate land acquisition for population 3.

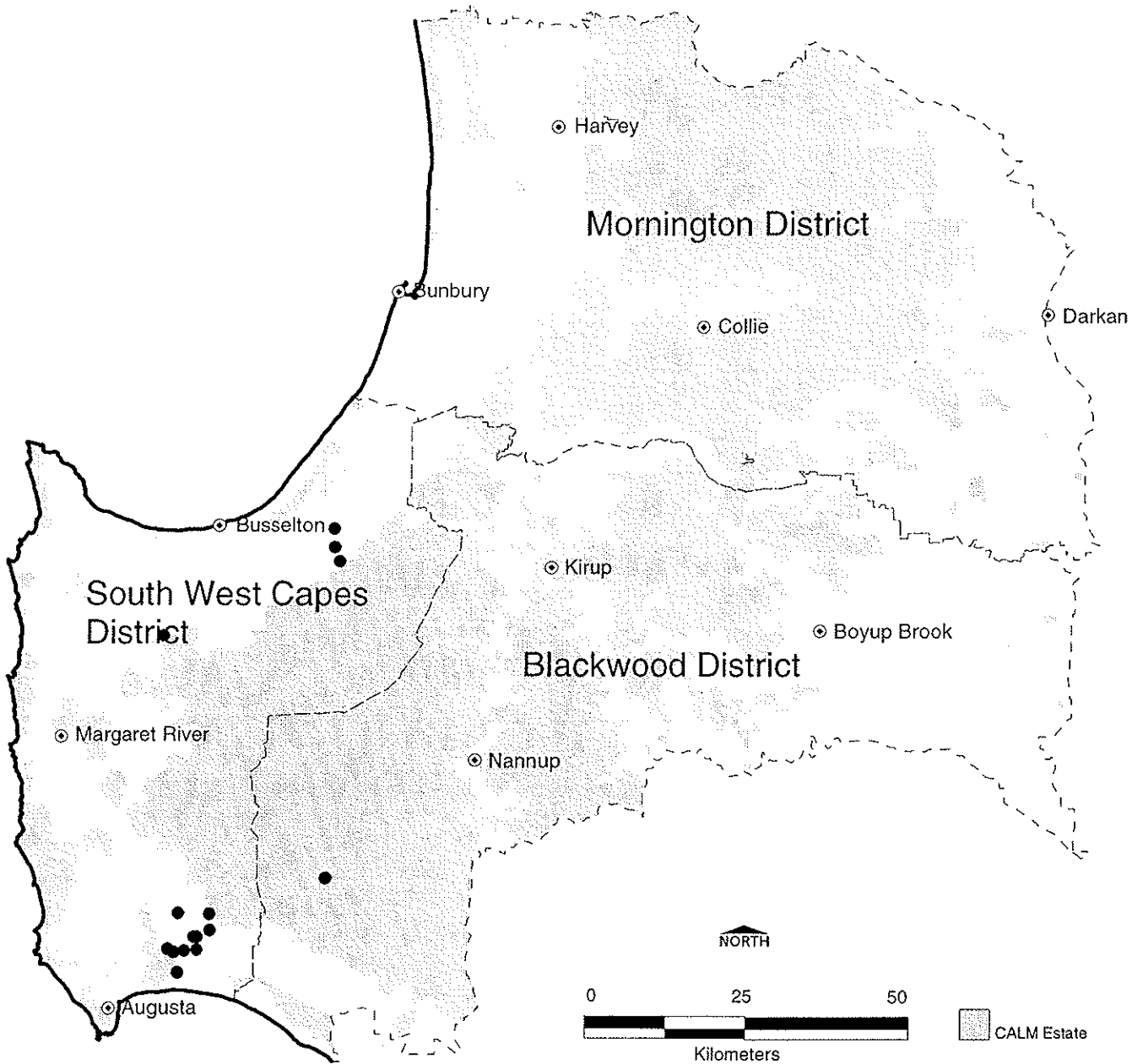
### Research Requirements

Revise taxonomy of *Calothamnus lateralis* complex.

### References

- Hawkeswood, T.J. (1987) A revision of the genus *Calothamnus*; Labill. (Myrtaceae: Leptospermoideae). Part 1. The 4-merous species. *Nuytsia* 6, 67-126.
- Mattiske, E.M. and Assoc. (1990) Flora and Vegetation Appendix VII Beenup Heavy Minerals Mine. ERMP

# Central Forest Region Threatened Flora Management Plan



- **Calothamnus sp. Scott River  
(R.D.Royce 84) [aff. crassus]**

*Chordifex isomorphus* (K.W. Dixon & K.A. Meney) B.G. Briggs & L.A.S. Johnson  
RESTIONACEAE

A tufted to shortly creeping plant, roughly circular, to 45 cm wide. The rhizomes are elongated, of variable length, 2-3 mm wide. Culms ("leaves") are simple, smooth, finely striate, 60-70 cm tall x 1-1.2 mm wide, erect and parallel, green at internodes and solid.

*Restio isomorphus* is similar to *Restio stenandra* in plant habit and spikelet morphology, but is distinct in having superficially similar male and female spikelets and in the flared purple and fawn culm sheaths.

**Flowering Period:** Late February to April.

**Distribution and Habitat**

Found only in the Scott Plains. Favours shallow white or red sandy soil over lateritic ironstone often with a perched water-table during winter and spring.

**Conservation Status**

Priority 2

**Known Populations**

|   | Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 | Governor Broome Rd | SWC      | AMR   | Road        | 16.11.93    | -             | -         |
| 2 | Lot 4261 (BHP)     | SWC      | AMR   | PP          | 19.1.96     | 2000+         | -         |

**Response to Disturbance**

Plants killed by fire and regenerate from seed.

**Susceptibility to *Phytophthora* Dieback**

Unknown.

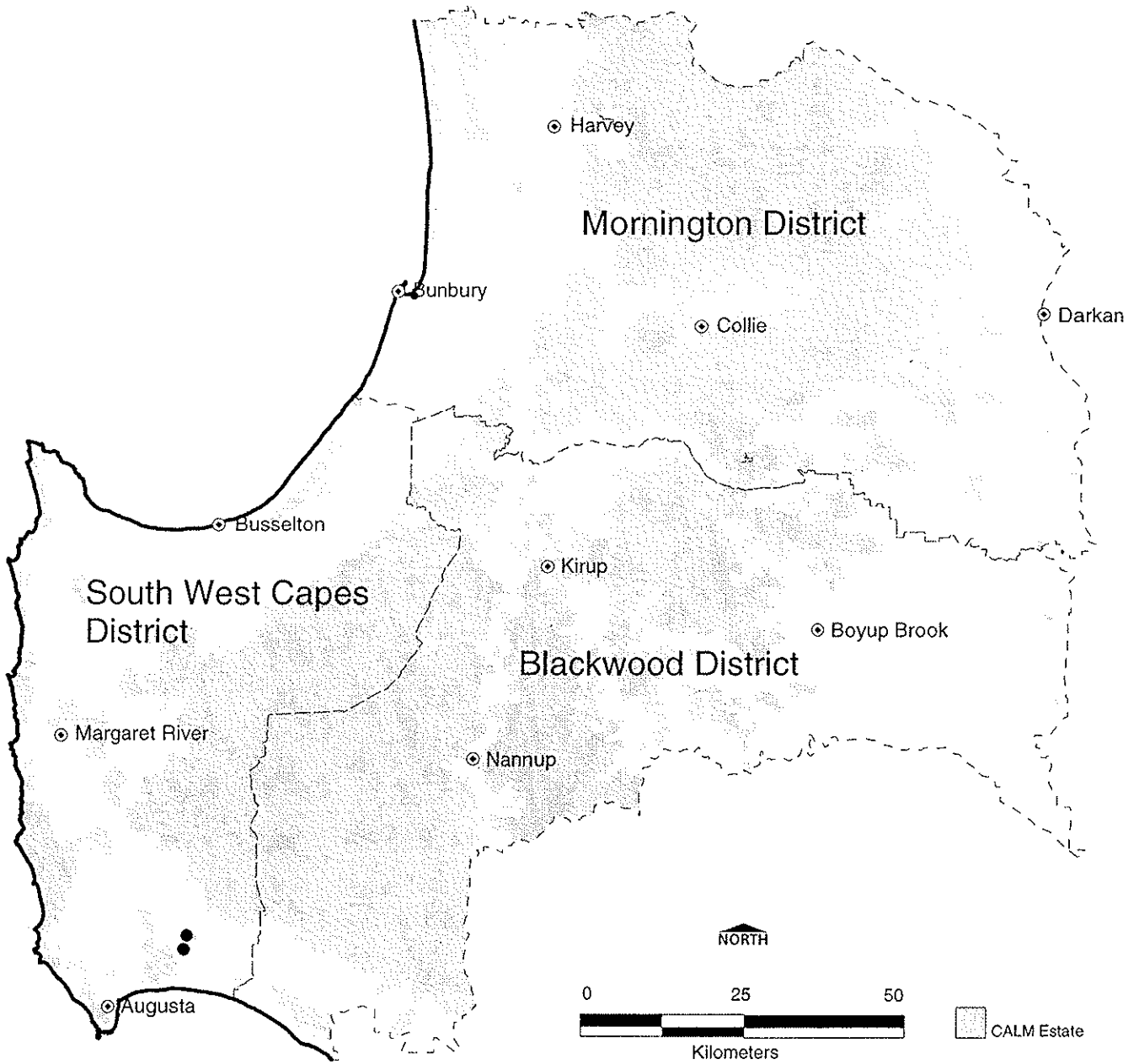
**Management Requirements**

**Research Requirements**

**References**

Dixon, K.W., Meney, K.A., and Pate, J.S. (1993) A new species of Restionaceae from south-western Western Australia. *Nuytsia* 9, 91-94.

# Central Forest Region Threatened Flora Management Plan



● **Chordifex isomorphus ms**

*Conospermum quadripetalum* E.M. Benn.

PROTEACEAE

A shrub to 1.5 m. Terete basal leaves and intricately branched panicles of white to pale blue flowers.

**Flowering Period:** November

**Distribution and Habitat**

This species is known from Albany, Torndirrup and Scott River, the latter of which is located within Scott National Park, in sandy clay flats. An attempt in 1991 to relocate the Scott River population was unsuccessful. (Draft note: may need to look at Herb specimens for other areas and possibly CALM file again to check for vegetation associations, as no details available for CF population)

**Conservation Status**

Priority 2

**Known Populations**

| Population       | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Scott NP       | SWC      | AMR   | NP          | 19.11.90    | -             | -         |
| 2 Scott River Rd | SWC      | AMR   | Road        | 4.9.85      | -             | -         |

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

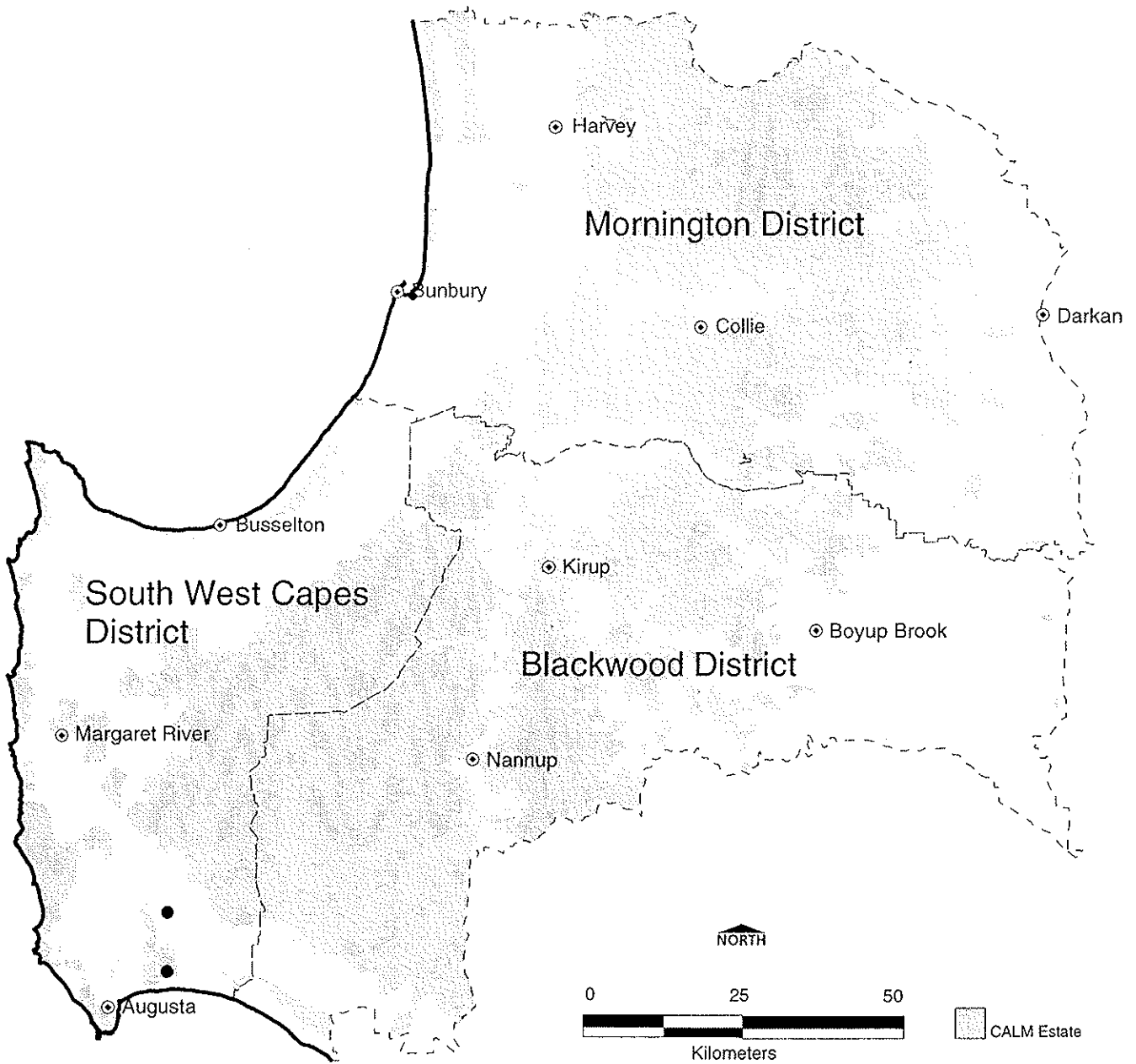
Unknown

**Management Requirements**

Resurvey Scott River population to establish whether still exists, note of file to the effect that E. Bennett gave location to CALM seed collector in 1991, but he was unable to find it.

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● **Conospermum quadripetalum**



*Dryandra sessilis* Knight (Domin.) var. *cordata* (Meisn.) A.S. George

PROTEACEAE

*Dryandra sessilis* var. *cordata* is a shrub or small tree to 5 m high. Branchlets usually minutely and sparsely hairy, often with long hairs near the summit. Leaves sessile or sometimes distinctly petiolate, cuneate in shape, prickly-toothed, terminating in a tooth. Flower head terminating in a leafy branchlet, bracts densely ciliate but otherwise glabrous. Flowers yellow. Fruit a compressed follicle.

**Flowering Period:** May to November

**Distribution and Habitat**

Found on coastal limestone based soils at Cape Naturaliste and Cape Leeuwin in the Central Forest Region. This species is also scattered along the coast between the capes.

**Conservation Status**

Priority 2

**Known Populations**

|   | Population       | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---|------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 | Cape Naturaliste | SWC      | BSN   | NP          | 14.1.98     | 100+          | good      |
| 2 | Cape Leeuwin     | SWC      | AMR   | NP          | 3.5.98      | 100+          | good      |

**Response to Disturbance**

Unknown

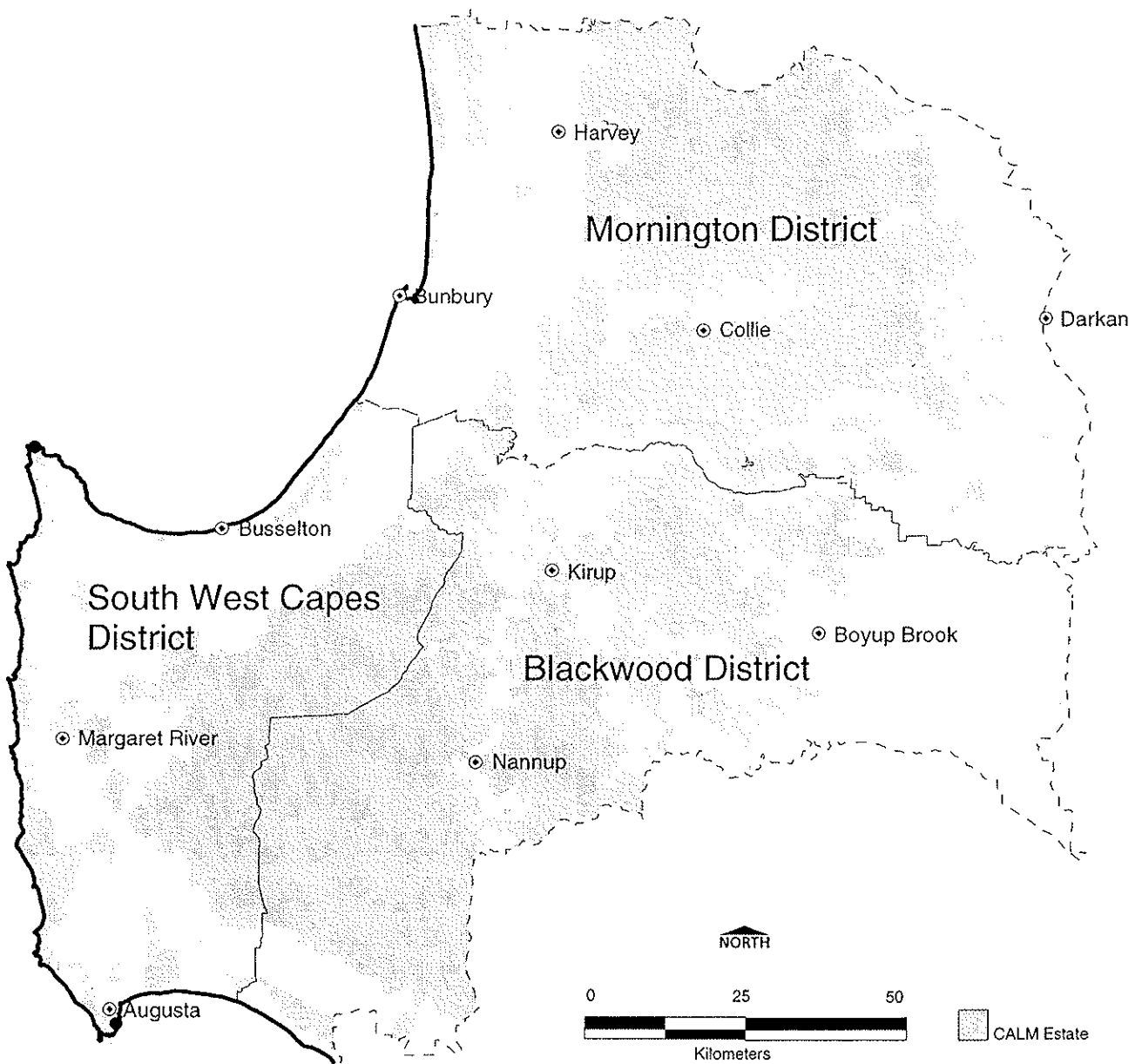
**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● *Dryandra sessilis* var. *cordata*

*Dryandra subpinnatifida* C.A. Gardner var. *imberbis* A.S. George

PROTEACEAE

First identified in 1964, *Dryandra subpinnatifida* is a small shrub growing 60 - 70 cm in height and 1 m in width. Juvenile leaves appear pinnatifid with sharply pointed small triangular lobes divided to the midrib. As the leaves mature to about 15 - 25 cm length the lobes almost disappear, and for the remainder of the leaf's length it is entire, about 5 mm wide and sometimes curls down slightly at the tip. The margins of the leaf are curled and the midrib is prominent. The small flower heads are set well down amongst the foliage and surrounded by numerous, long, pinnatifid floral leaves. They are bright yellow, about 3 cm long x 2 cm wide. The involucre is globular, quite small with numerous, long linear bracts.

This species is most closely allied to *D. squarrosa*, from which it differs in the much larger flower, situated terminally rather than axillary, and entirely different foliage, which is distinct from all other species of the genus.

*D. subpinnatifida* has recently been classified into two variants; *imberbis* and *subpinnatifida*.

**Flowering Period:** September to October

**Distribution and Habitat**

Known from three locations within the Central Forest Region and a single location in the Wheatbelt Region at Broomehill. It occurs on lateritic loam in dense heathland. It appears to have hybridised with *D. squarrosa* at the Bowelling population.

**Conservation Status**

Priority 2

**Known Populations**

| Population     | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 W of Kojonup | BWD      | BOY   | -           | 21.10.67    | -             | -         |
| 2 Bowelling    | MON      | WEA   | -           | 30.7.95     | occasional    | -         |
| 3 Boolading    | MON      | WEA   | PP          | -           | -             | -         |

**Response to Disturbance**

Not documented - may be information arising from WB populations

**Susceptibility to *Phytophthora* Dieback**

Not documented - may be information arising from WB populations

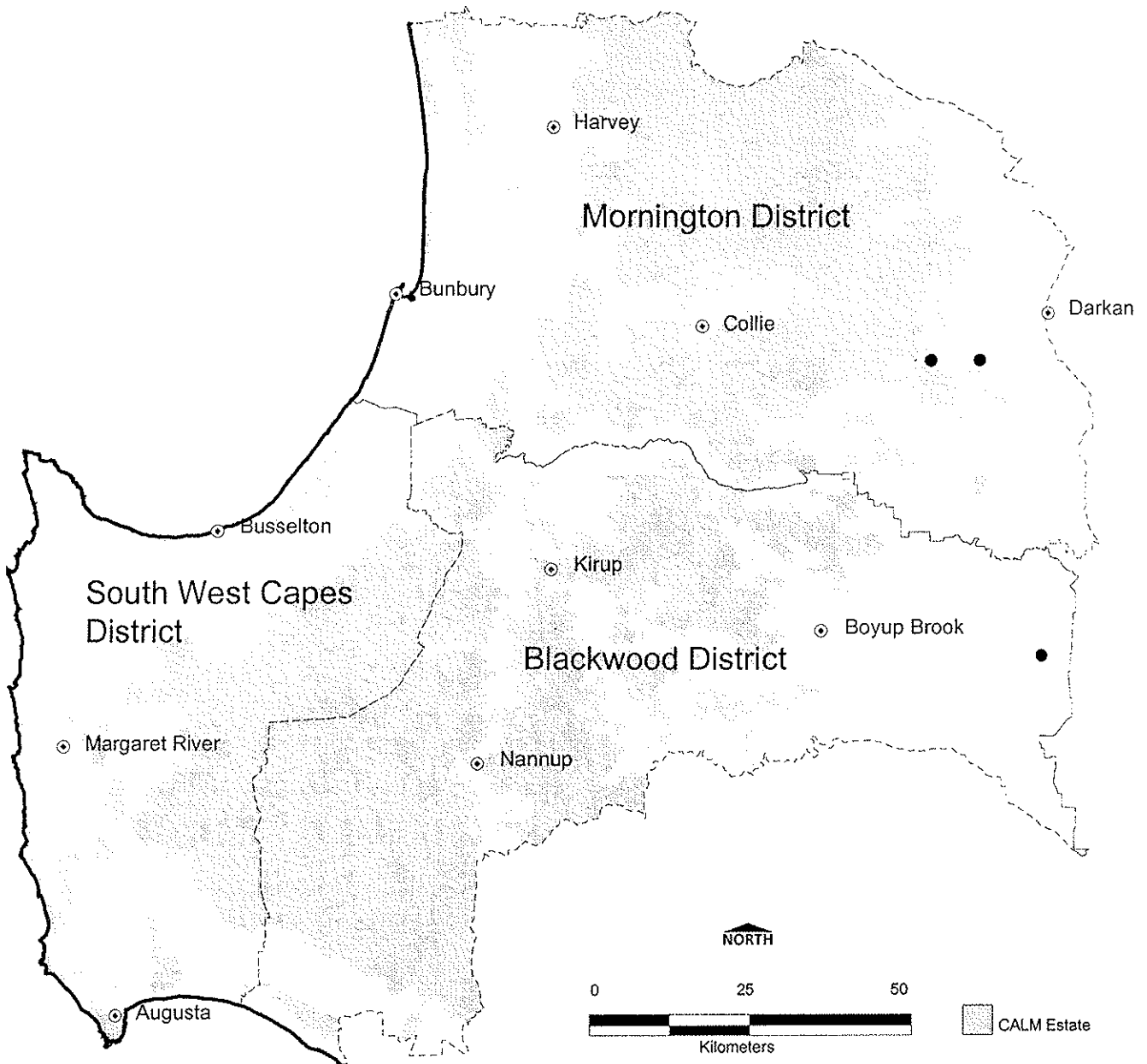
**Management Requirements**

**Research Requirements**

**References**

- Sainsbury, R.M. (1985) *A Field Guide to Dryandra*. University of Western Australia Press, Nedlands.  
Gardner, C.A. (1964) Contributions Florae Australiae Occidentalis XIII. *Journal of the Royal Society of Western Australia* 47, 54-64.  
George, A.S. (1996) New taxa and a new infrageneric classification in *Dryandra* R.Br. (Proteaceae: Grevilleoideae). *Nuytsia* 10, 313-408.

# Central Forest Region Threatened Flora Management Plan



- *Dryandra subpinnatifida* var. *imberbis*

*Eryngium pinnatifidum* Bunge subsp. *palustre* Keighery ms

APIACEAE

Erect perennial herb to 50 cm. Flowers white or pale blue.

**Flowering Period:** October to November

**Distribution and Habitat**

Distribution extends from Geraldton Sandplains to Jarrah Forest and Swan Coastal Plain. The Central Forest population occurs in the Ludlow Tuart forest. It prefers claypans of seasonally wet flats.

**Conservation Status**

Priority 2

**Known Populations**

| Population     | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Tuart Forest | SWC      | BSN   | SF          | 13.12.94    | common        | -         |

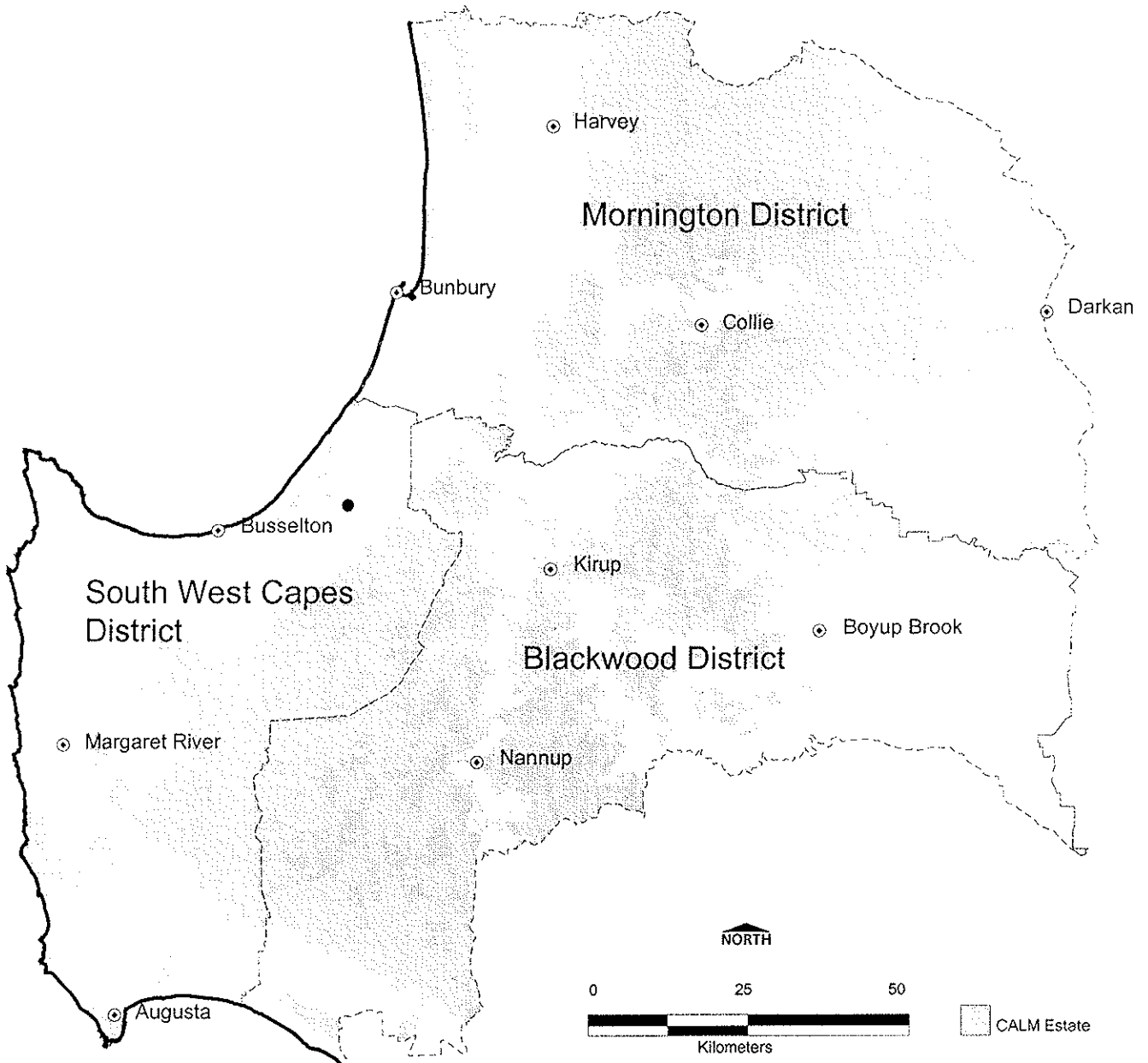
**Response to Disturbance**

**Susceptibility to *Phytophthora* Dieback**

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



- *Eryngium pinnatifidum subsp. palustre ms*

## *Euphrasia scabra* R.Br

## SCROPHULARIACEAE

Erect annual herb, becoming brittle, to 15-35 (50) cm tall. Stem leaves in outline usually ovate-elliptic to elliptic, covered by dense, short to moderately long rough hairs, sometimes mixed with sparse, short glandular hairs. Leaf margins are recurved (edges curled under) with teeth along each margin. Leaves on branches are similar but somewhat smaller. The inflorescences are dense racemes. The rachis (main flower inflorescence stem) is usually covered by a dense mixture of short to moderately long glandular and non-glandular hairs. The petals have a broadly grooved lower side, are yellow, sometimes with 3 red-brown striations present on the hood and lower lip behind each lobe.

### Flowering Period

Flowering times seem to vary considerably throughout the range of the species. Plants begin flowering between early October and February. The main stem inflorescences cease bearing flowers by November to March, while those of the branches continue to produce at least until early January to April.

As this species is an annual herb, populations can only be located during the correct season. Therefore it is recommended that searches for additional populations occur during this time, and its status can only be accurately ascertained following significant survey effort.

### Distribution and Habitat

*E. scabra* has been found in a wide range of habitats. From specimen annotations, it is frequently found in open grassy areas, which may be wet. It has also been recorded from sand associated with dunes and salt lakes along the coast of South and Western Australia, and in dry heath and dry forest land in south-eastern Australia and Tasmania (W.R. Barker J. Adelaide Bot. Gard. 5 (1982)). Populations in W.A. occur at Lake Muir, Yorn Creek and the Stirling Range.

### Conservation Status

Priority 2

### Known Populations

| Population        | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Harvey River    | MON      | HVY   | -           | -           | -             | -         |
| 2 Blackwood River | SWC      | AMR   | -           | -           | -             | -         |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

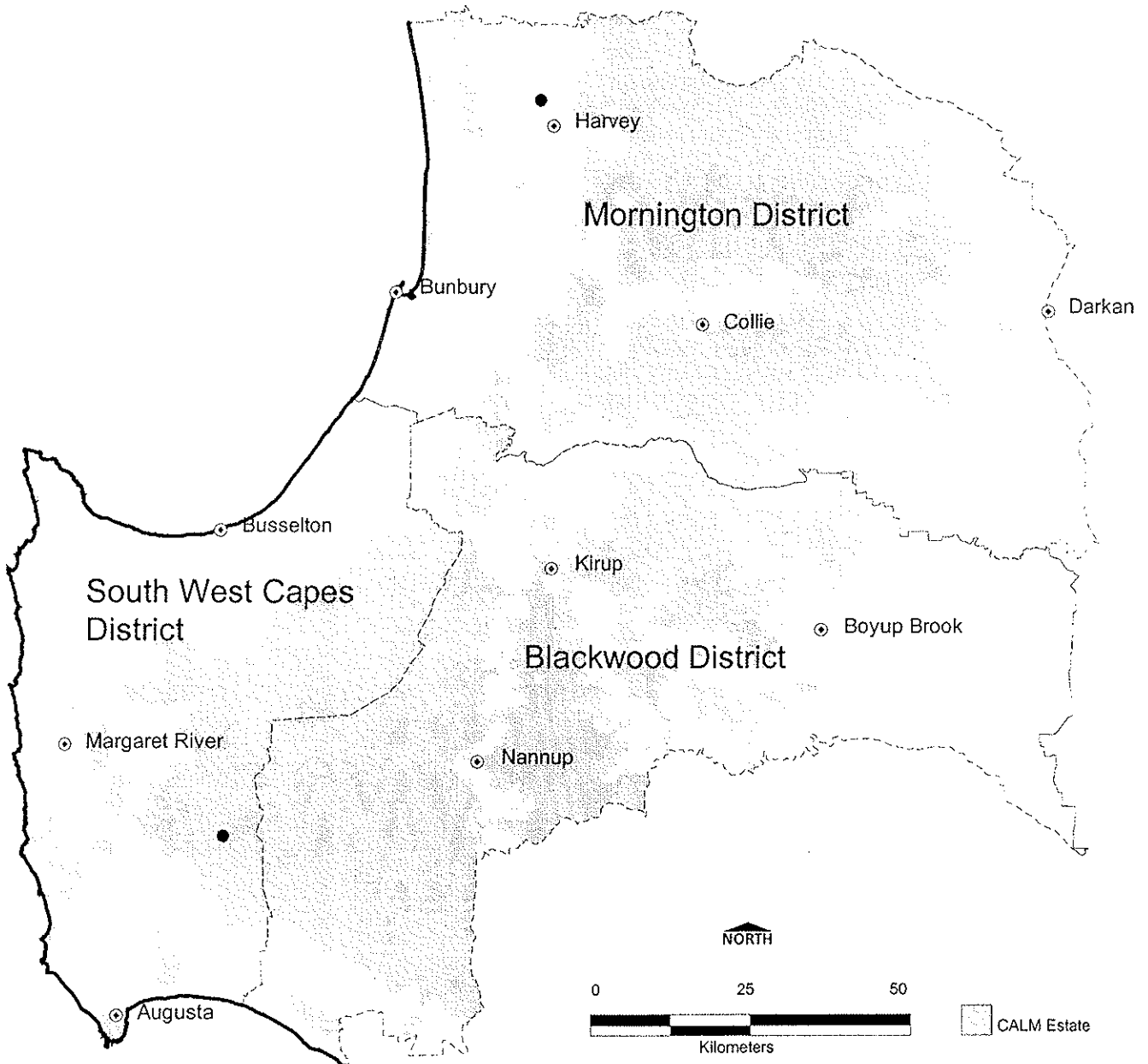
### Research Requirements

The last collections of *E. scabra* were in the 1970's and previously, at the turn of the century. It would require survey work within the correct season (which tends to be variable) to determine its present distribution.

### References

Barker, W.R. (1982) Taxonomic studies in *Euphrasia* L. (Scrophulariaceae). A revised infrageneric classification, and a revision of the genus in Australia. *Journal of the Adelaide Botanic Gardens* 5, 1-304.

# Central Forest Region Threatened Flora Management Plan



● *Euphrasia scabra*



*Fabronia hampeana* F.H. Sond.

FABRONIACEAE

Moss

**Flowering Period:**

**Distribution and Habitat**

Only recorded at two unknown urban sites likely to have been destroyed by urban development. Given this species' habitat requirements, and this habitat type's occurrence in the Central Forest Region, Dr. Ken Atkins has requested the inclusion of *Fabronia hampeana* to this plan.

**Conservation Status**

Priority 2

**Known Populations**

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
|------------|----------|-------|-------------|-------------|---------------|-----------|

No CFR Populations

**Response to Disturbance**

**Susceptibility to *Phytophthora* Dieback**

**Management Requirements**

**Research Requirements**

*Grevillea brachystylis* Meisn. subsp. *brachystylis*

PROTEACEAE

Much branched dense prostrate shrub from 30 cm to 1 m tall by 30 cm to 3 m wide. Flowers deep, bright red. Generally, *Grevillea brachystylis* species is a spreading, straggling, prostrate or erect shrub 0.4-1.8 m tall. Branches sometimes one sided. The branchlets are angular and have parallel ridges, soon becoming nearly round in cross section and they are sparsely hairy to hairy (occasionally smooth). Leaves are simple, linear to narrowly elliptical or sometimes narrowly obovate, sessile (no leaf stalk, attached directly to stem), 6-12 cm long x 2-7 mm wide and always have a conspicuous point at the apex (leaf margins are usually curled under. Inflorescences are terminal or occasionally axillary, usually on short branches, sessile to pedunculate (with or without flower stalks), simple or sparingly branched. The receptacle is very oblique, sometimes lateral and 1.8-4.5 mm long.

*G. brachystylis* subsp. *brachystylis* has thinner leaves than *G. brachystylis* subsp. *australis*.

**Flowering Period:** August to November

**Distribution and Habitat**

Occurs in low lying winter wet flats on sand over clay or sandy loam soils amongst low dense heath or swamp heath. Populations occur only in the Central Forest Region at Busselton, Ruabon, Yoongarillup and Jarrahwood.

*G. brachystylis* subsp. *australis* is similar but occurs on the Scott River and Blackwood River Plains only (see *G. brachystylis* subsp. *australis* P2).

**Conservation Status**

Priority 2

**Known Populations**

| Population          | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Fish Rd NR        | SWC      | BSN   | Water       | 30.6.97     | 20+           | moderate  |
| 2a Ruabon Road      | SWC      | BSN   | Shire       | 27.6.97     | 10+           | moderate  |
| 2b Ruabon Road      | SWC      | BSN   | Rail        | 27.6.97     | 60+           | moderate  |
| 3 Ambergate Reserve | SWC      | BSN   | Shire       | 30.6.97     | 100's         | good      |
| 4 Don Road          | SWC      | BSN   | Shire       | 24.1.96     | 0             | poor      |
| 5 Edwards Road      | SWC      | BSN   | Shire       | 5.1.96      | 15            | moderate  |
| 6 Ambergate Road    | SWC      | BSN   | Shire       | 8.1.96      | 4             | poor      |
| 7 Chapman Hill Road | SWC      | BSN   | Shire       | 18.7.96     | 21            | moderate  |
| 8 Evans Road        | SWC      | BSN   | Shire       | 18.7.96     | 13            | moderate  |
| 9 Kaloorup Road     | SWC      | BSN   | Shire       | 2.5.97      | 20+           | poor      |
| 10 Doyle Road       | SWC      | BSN   | Shire       | 11.6.97     | 3             | moderate  |
| 11 Price Road       | SWC      | BSN   | Shire       | 24.6.97     | 30+           | moderate  |

**Response to Disturbance**

Many roadside plants being choked by weed invasion.

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

**Research Requirements**

**References**

Olde, P.M. and Marriott, N.R. (1995) *The Grevillea Book 2*: 68-69. Kangaroo Press, Kenthurst N.S.W.

## *Grevillea candolleana* Meisn.

## PROTEACEAE

A low shrub with erect or rounded habit. Ascending (base of stems arching out, the top becoming upright), loosely branched stems.

The branches are more or less hairy. Leaves are almost sessile (virtually no stalk), oblong-lanceolate to almost linear, 1.9-3.8 cm long or smaller on the side branches, the tip ending in a sharp point and the leaf margins turned under. The leaf surface is smooth above and white-hairy underneath. The flowers creamy to creamy white with the tip of the style being yellow, orange or red. Terminal racemes are umbel-like and sessile (no main inflorescence stalk). Pedicels (individual flower stalks) are 0.6-1.2 cm and densely hairy. The perianth has dense soft hairs and the tube is revolute.

A similar species is *G. scabra* which can be distinguished from *G. candolleana* by its rough leaf surface.

**Flowering Period:** Winter to Spring

### **Distribution and Habitat**

Mainly occurs from the Swan Region at Toodyay and the Avon Valley National Park in laterite-loam soil in associations of *Eucalyptus wandoo* (Wandoo) or *Eucalyptus marginata* (Jarrah) and *Corymbia calophylla* (Marri).

### **Conservation Status**

Priority 2

### **Known Populations**

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Hampden  | MON      | HVY   | -           | -           | -             | -         |

### **Response to Disturbance**

Unknown

### **Susceptibility to *Phytophthora* Dieback**

Unknown

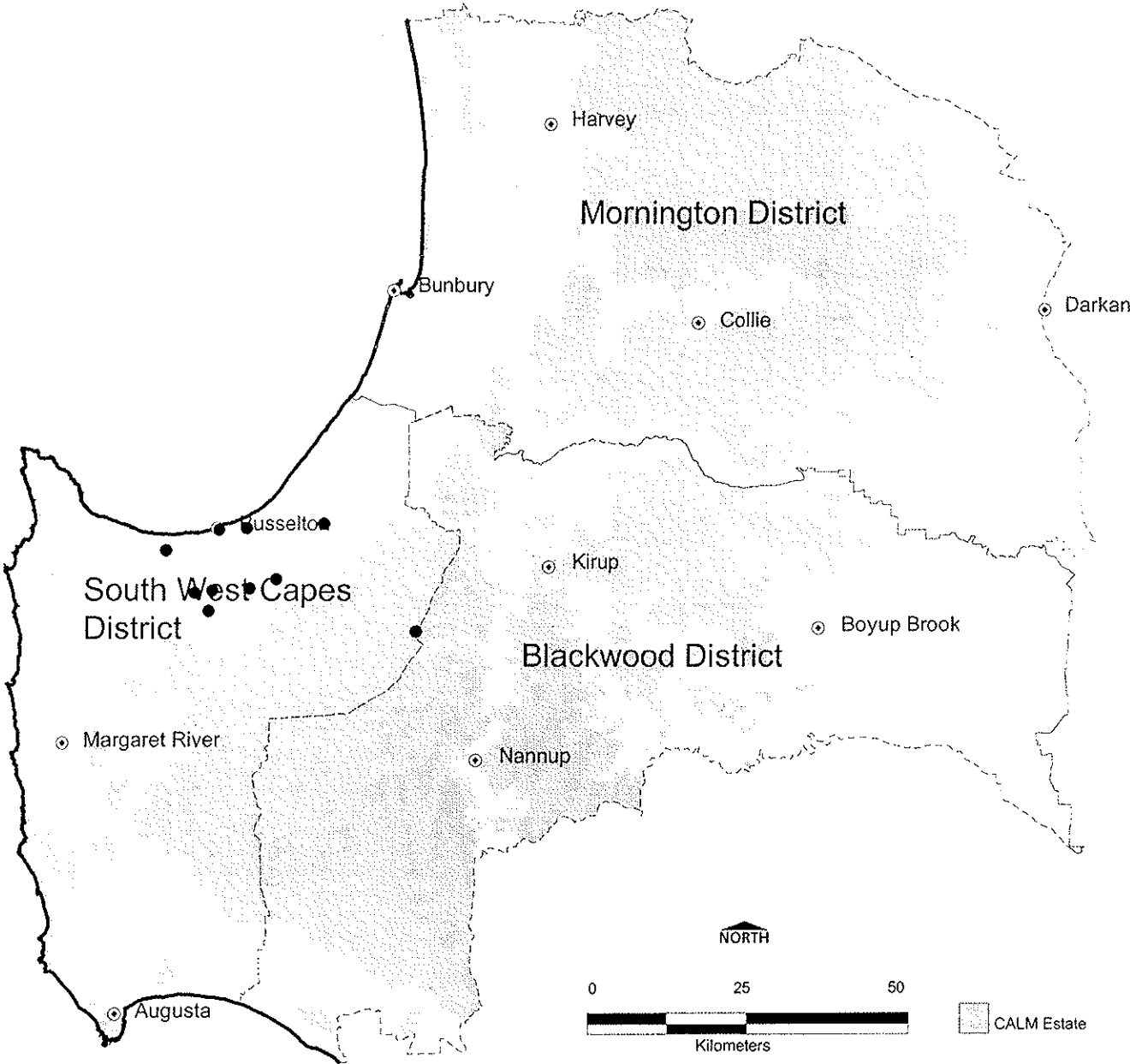
### **Management Requirements**

### **Research Requirements**

### **References**

Olde, P.M. and Marriott, N.R. (1995) *The Grevillea Book 2*: 84-85. Kangaroo Press, Kenthurst N.S.W.

# Central Forest Region Threatened Flora Management Plan



● *Grevillea brachystylis* subsp. *brachystylis*

*Hakea tuberculata* R.Br.

PROTEACEAE

Erect, slender, columnar shrub to 3 m high. Flowers white.

**Flowering Period:** September to December

**Distribution and Habitat**

Occurs on shallow red loam over ironstone in winter wet flats on the Scott River Plain.

**Conservation Status**

Priority 2

**Known Populations**

|   | Population           | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---|----------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 | Scott River          | SWC      | AMR   | NP          | 1.6.95      | f. common     |           |
| 2 | Governor Broome Rd A | SWC      | AMR   |             | 2.6.95      | rare          |           |
| 3 | Governor Broome Rd B | SWC      | AMR   |             | 2.6.95      | uncommon      |           |

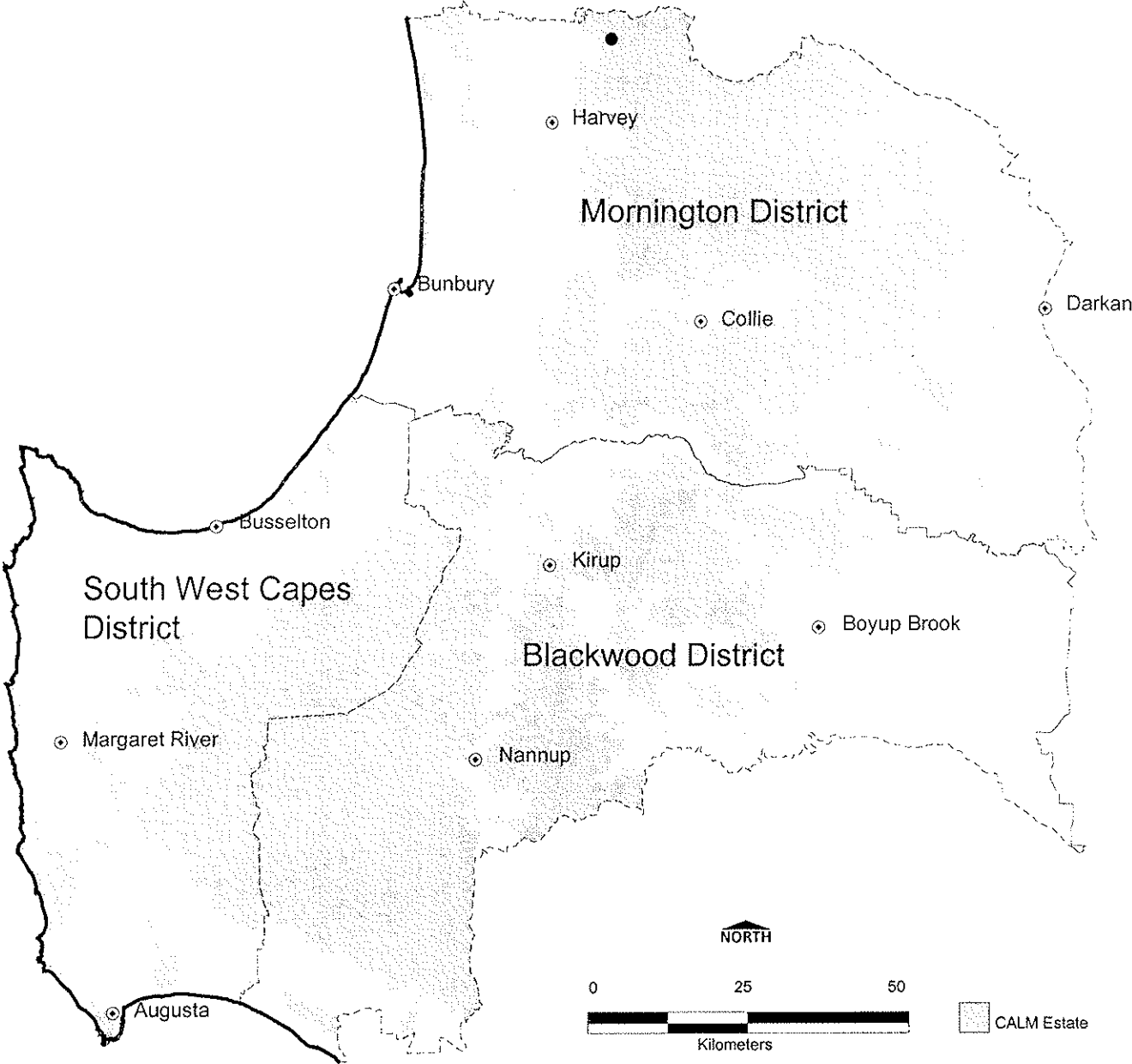
**Response to Disturbance**

**Susceptibility to *Phytophthora* Dieback**

**Management Requirements**

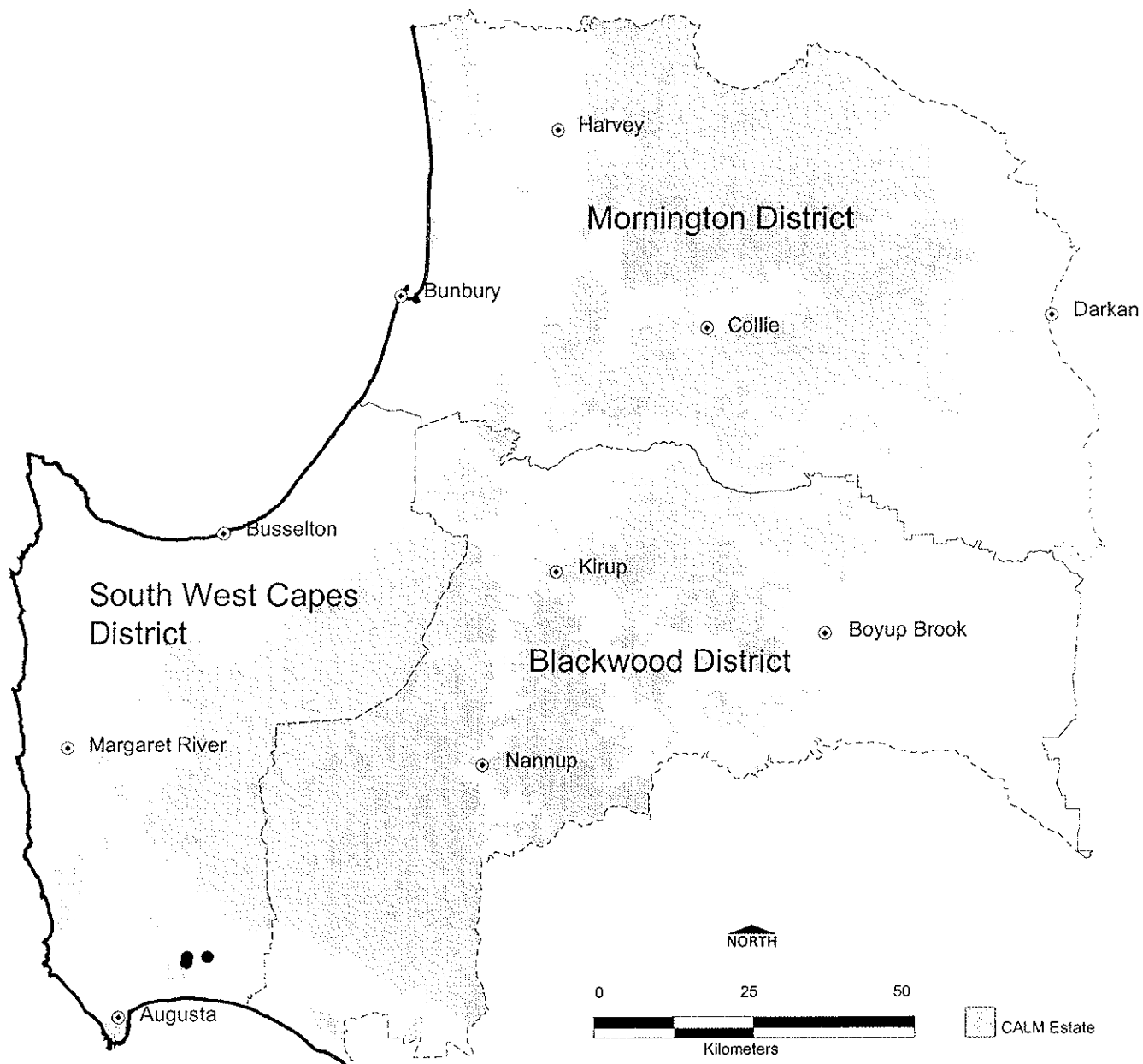
**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● *Grevillea candolleana*

# Central Forest Region Threatened Flora Management Plan



● *Hakea tuberculata*

## *Haloragis aculeolata* Benth.

## HALORAGACEAE

*Haloragis aculeolata* is an erect herb to 40 cm tall with stems weakly 4 or 5 ribbed, smooth to sparse, curved hairs. The alternate, sessile leaves to 25 mm long, are divided with 6-8 long teeth on the leaf edge farthest from the point of attachment to the stem. The foliage may be pale green to reddish. The inflorescences are clusters of 1-3 flowers, in the upper axils subtended by small green, lanceolate bracts, 5-10 mm. The small 4-merous, green flowers have ovate sepals to 1 mm and petals to 2.2 mm; on 0.5 mm flower stalks.

*H. aculeolata* is most closely related to *H. hamata*, but differs in its curved (not hooked) hairs and longer, more coarsely toothed leaves. *H. aculeolata* may also be related to *H. scoparia*, but differs in being glabrous and having a strictly 2-locular (2 chambers) ovary and fruit.

**Flowering Period:** October to January

### Distribution and Habitat

This species occurs in coarse sandy soils (over limestone or schist) in *Eucalyptus gomphocephala* (Tuart) tall shrubland. It has been infrequently collected at the widely distributed locations of Yanchep, Cannington (last seen in 1901), Lake Preston and Toolbrunup (Stirling Range). At Ellis Road, this species grows within a *Melaleuca incana* low open shrubland.

### Conservation Status

Priority 2

### Known Populations

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Ellis02  | MON      | HVY   | NP          | 9.4.94      | 1000+         | good      |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

### Research Requirements

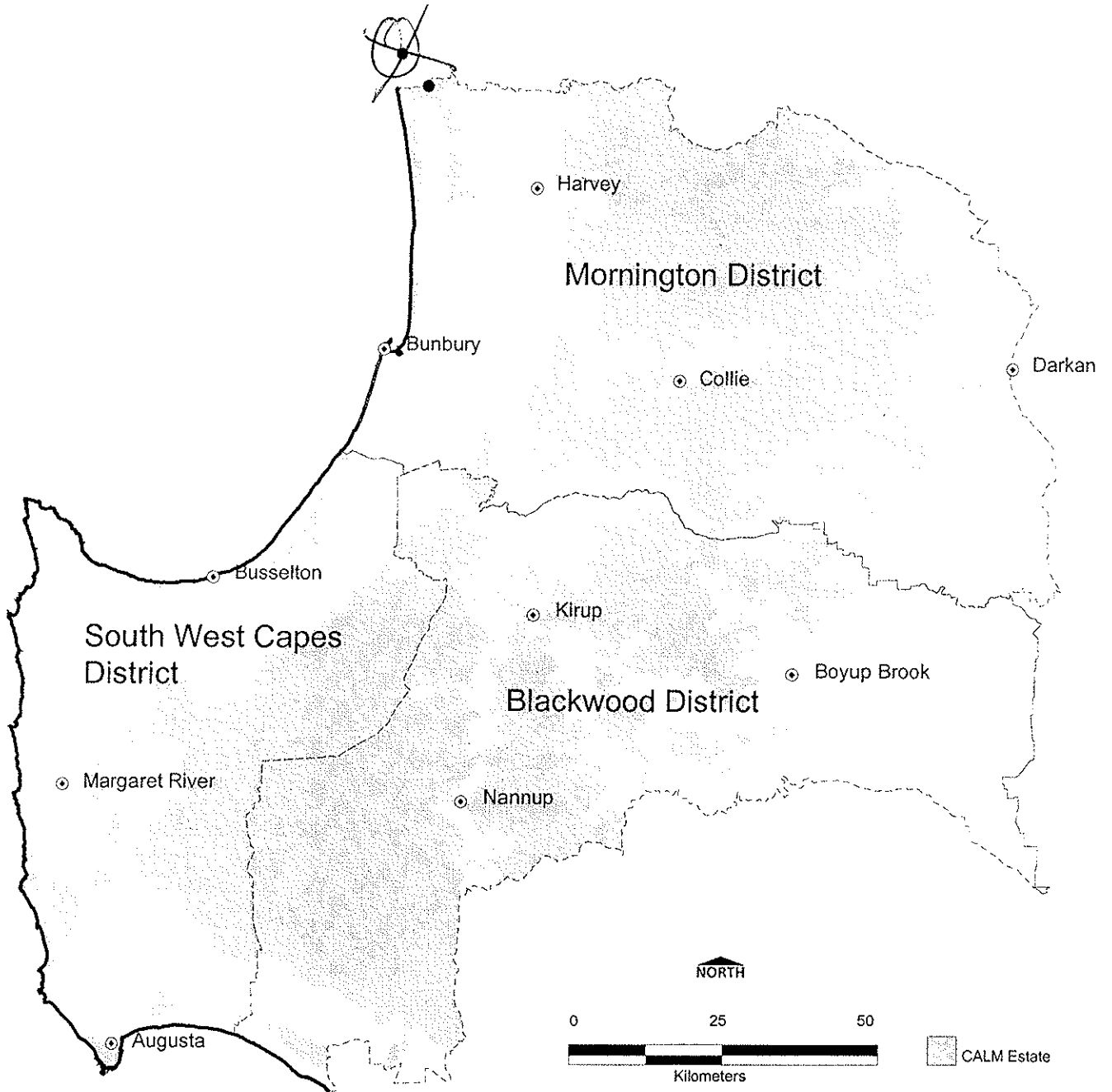
Determine status of Swan Coastal Plain populations.

### References

Kelly, A.E., Taylor, A., Langley, M.A., Spooner, A. and Coates, D. (1993) *Declared Rare Flora and Other Plants in Need of Special Protection in the Metropolitan Area*. Wildlife Management Program, Department of Conservation and Land Management, Western Australia.



# Central Forest Region Threatened Flora Management Plan



● *Haloragis aculeolata*

*Hybanthus volubilis* E.M. Benn.

VIOLACEAE

Small twining perennial herb. The leaves are linear-lanceolate, acute, 10 – 18 mm long. Flowers solitary, axillary. Flower scapes recurved, ca. 4 mm long. Sepals narrowly lanceolate, acute, 2 – 2.5 mm long. Petals blue – mauve; anterior petal broadly spatulate, 6 – 8 mm long, mainly white; lateral and posterior petals oblong, truncate, recurved, 1.5 – 2.5 mm long.

**Flowering Period:** October to December

**Distribution and Habitat**

Occurs in the Central Forest Region at the Scott National Park and also Margaret River. Population also at Deep River in the Southern Forest Region.

This species favours clay or sandy clay soils on creeklines, rivers or winter wet depressions. Associated vegetation includes *Agonis linearifolia*, *Astartea fascicularis*, *Anigozanthos flavida*, *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri), *Eucalyptus patens* and *Hakea lasiantha*.

**Conservation Status**

Priority 2

**Known Populations**

| Population          | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Scott River NP    | SWC      | AMR   | NP          | 25.9.90     | -             | good      |
| 2 Challis' Property | SWC      | AMR   | PP          | 6.12.89     | -             | -         |
| 3 Rosa Brook        | BWD      | AMR   | -           | 9.1.97      | -             | -         |
| 4 Margaret River    | SWC      | AMR   | -           | 16.10.69    | -             | -         |
| 5 Osmington         | SWC      | AMR   | -           | 6.12.89     | occasional    | -         |

**Response to Disturbance**

Unknown

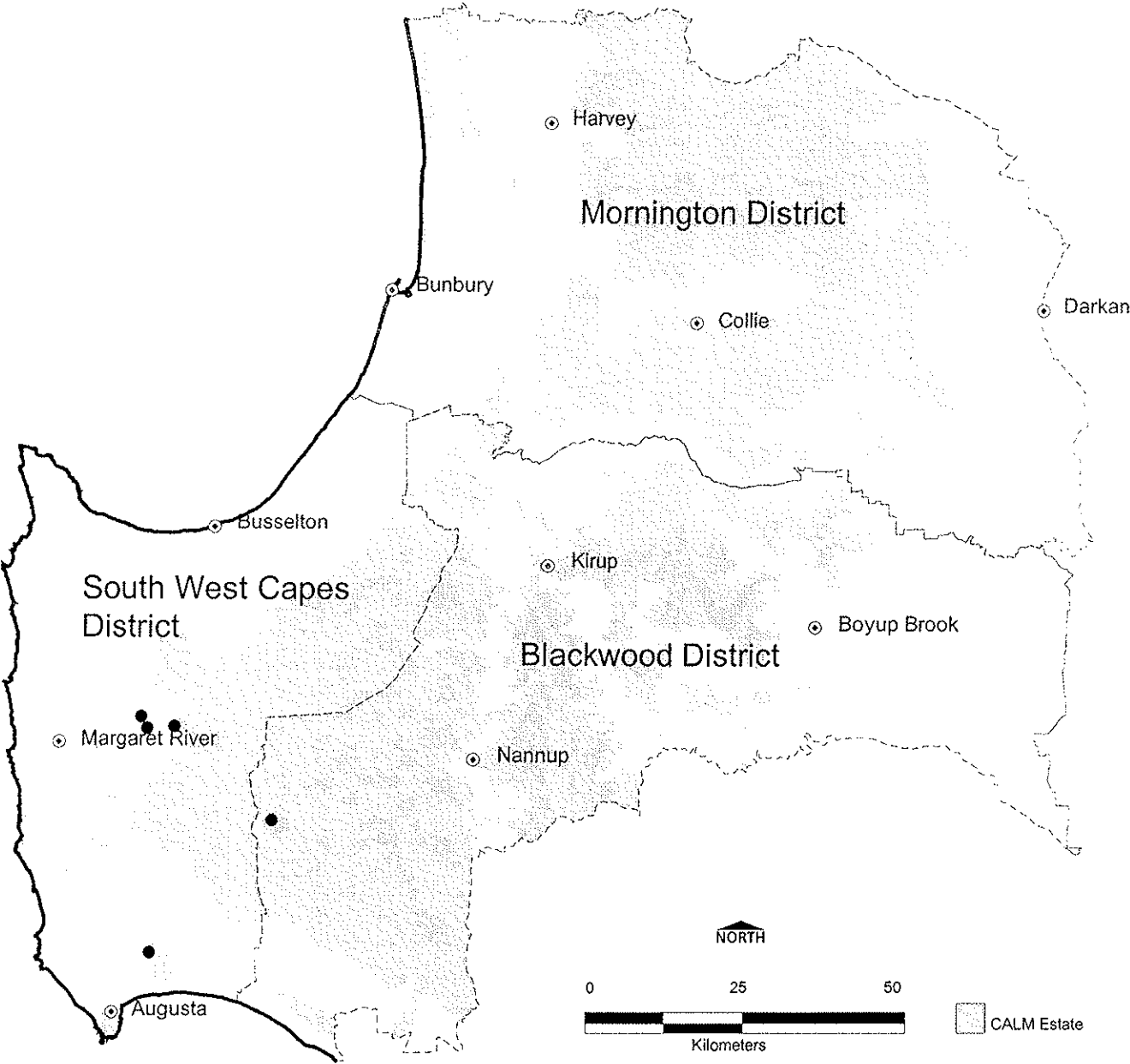
**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● *Hybanthus volubilis*

*Hydrocotyle hamelinensis* H. Eichler ms

APIACEAE

Prostrate annual herb

**Flowering Period:** September to October

**Distribution and Habitat**

Grows on limestone ridges on grey sand at Cape Naturaliste.

**Conservation Status**

Priority 2

**Known Populations**

| Population   | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Bunker Bay | SWC      | BSN   | NP          | 26.9.85     | -             | -         |
| 2 Yallingup  | SWC      | BSN   | NP          | 1.10.89     | -             | -         |

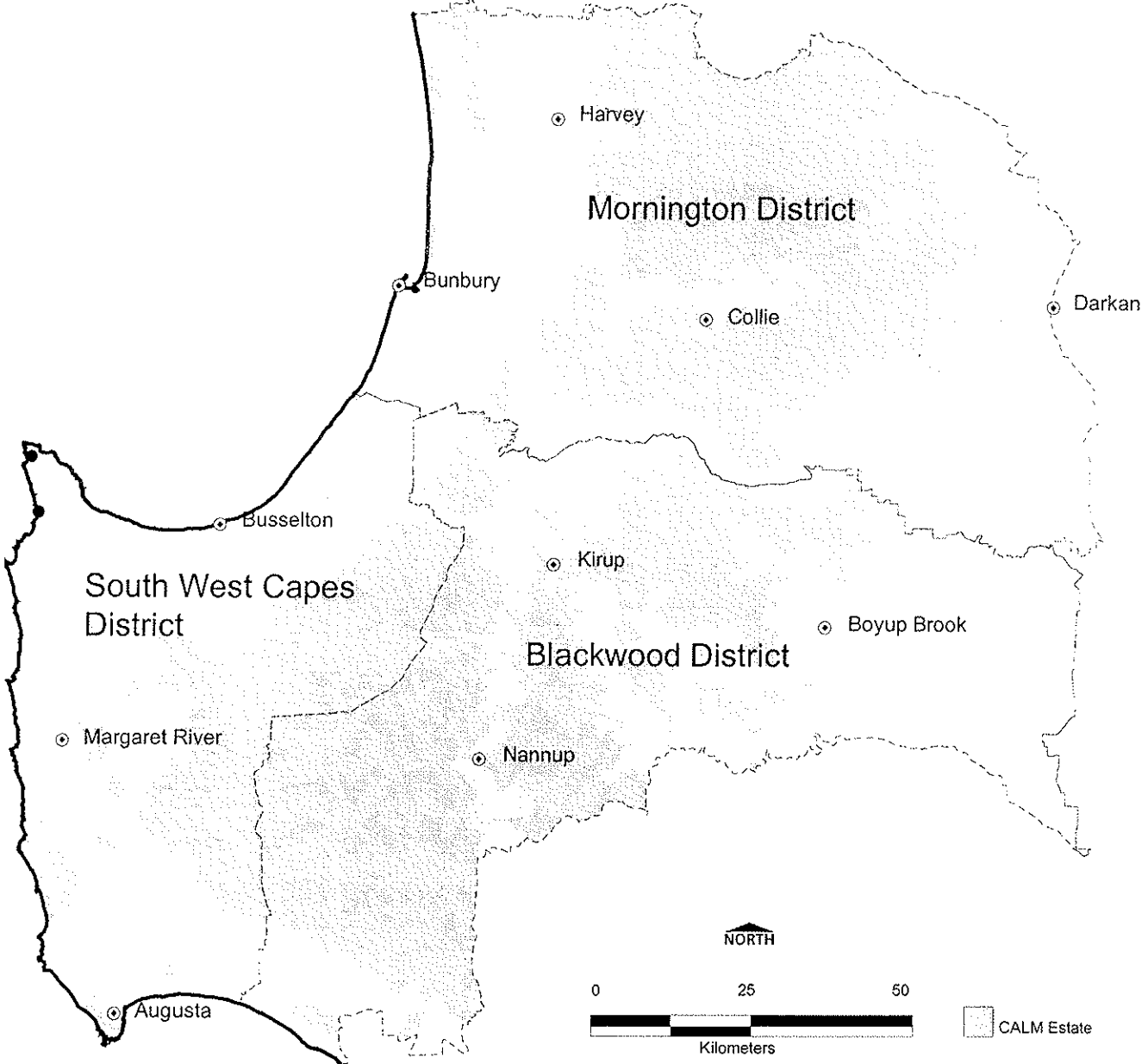
**Response to Disturbance**

**Susceptibility to *Phytophthora* Dieback**

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● *Hydrocotyle hamelinensis* ms

*Lasiopetalum membranaceum* (Steud.) Benth.

STERCULIACEAE

A low, multi-stemmed shrub to 65 cm high. The branchlets are densely covered by simple glandular and stellate (star like) hairs. Leaves are alternate, 30-50 mm long x 25-35 mm wide, petiolate, green and deeply cordate (heart shaped). Leaf surface has scattered, fine, stellate hairs and slightly curled under margins. The 6-12-flowered cymes are 35-60 mm long, and densely covered by simple and stellate hairs. Peduncles (inflorescence stalks) are 15-25 mm long and pedicels (individual flower stalks) 8-12 mm long. The petal like calyx is pink-mauve, about 5 mm long, with an outer surface covered by simple and stellate hairs and an inner surface almost smooth. The petal like calyx lobes are very narrowly ovate. Petals are absent. The style is 3 mm long.

**Flowering Period:** September to November.

**Distribution and Habitat**

A rarely collected species, occurring in sand in woodland with *Eucalyptus gomphocephala* (Tuart), *Agonis flexuosa*, *Acanthocarpus preissii*, *Templetonia retusa*, *Rhagodia baccata* and *Spyridium globulosum* near the coast from Yalgorup National Park (Swan Region) southward to Wonnerup.

**Conservation Status**

Priority 2

**Known Populations**

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Capel    | SWC      | CAP   | -           | 11.20       | -             | -         |
| 2 Ludlow   | SWC      | BSN   | NP          | 23.10.94    | -             | -         |

**Response to Disturbance**

Slow growing and probably affected by regular disturbance ie firebreaks, grading and prescribed or frequent burning. Has regenerated well N of Ellis Road after summer wildfire (S. Wood pers.comm.)

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

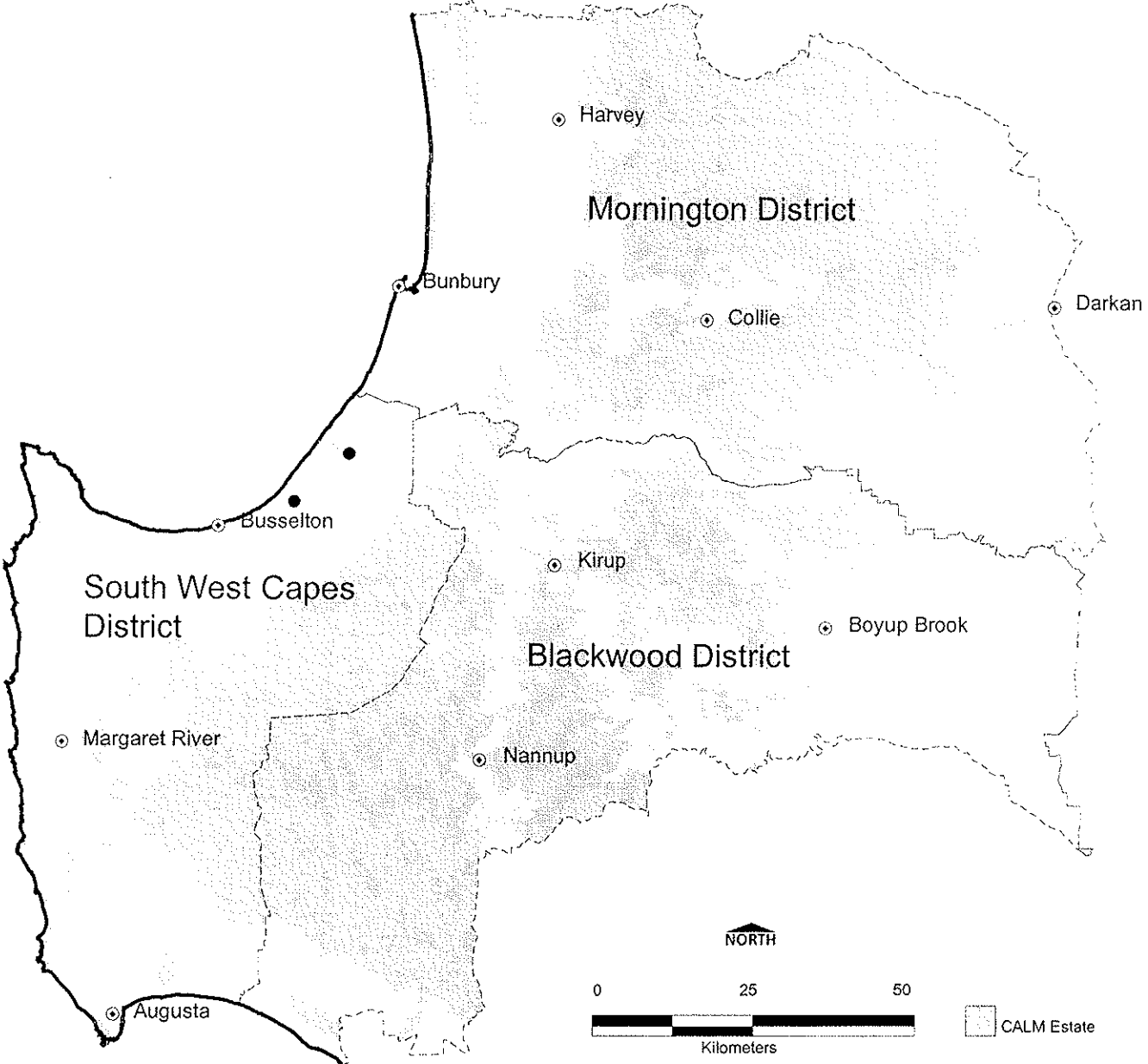
May be slow growing and therefore at risk from prescribed burning.

**Research Requirements**

**References**

Marchant, N.G., Wheeler, J.R., Rye, B.L., Bennett, E.M., Lander, N.S. and Macfarlane, T.D. (1987) *Flora of the Perth Region* Part 2. Western Australian Herbarium, Department of Agriculture, Western Australia.

# Central Forest Region Threatened Flora Management Plan



● *Lasiopetalum membranaceum*

*Leptinella drummondii* (Benth.) D.G. Lloyd & G.J. Webb

ASTERACEAE

Small herb. Flowers yellow to cream.

**Flowering Period:** November to December or January to February

**Distribution and Habitat**

Occurs along river courses in clay/loam mud. This species has been recorded from the Central Forest Region on the Blackwood River west of Nannup and the Frankland, Tone and Wilgarrup Rivers in the Southern Forest Region.

**Conservation Status**

Priority 2

**Known Populations**

| Population    | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Darradup    | BWD      | NAN   | SF          | 30.1.65     | -             | -         |
| 2 Sues Bridge | BWD      | NAN   | SF          | 20.2.73     | -             | -         |

**Response to Disturbance**

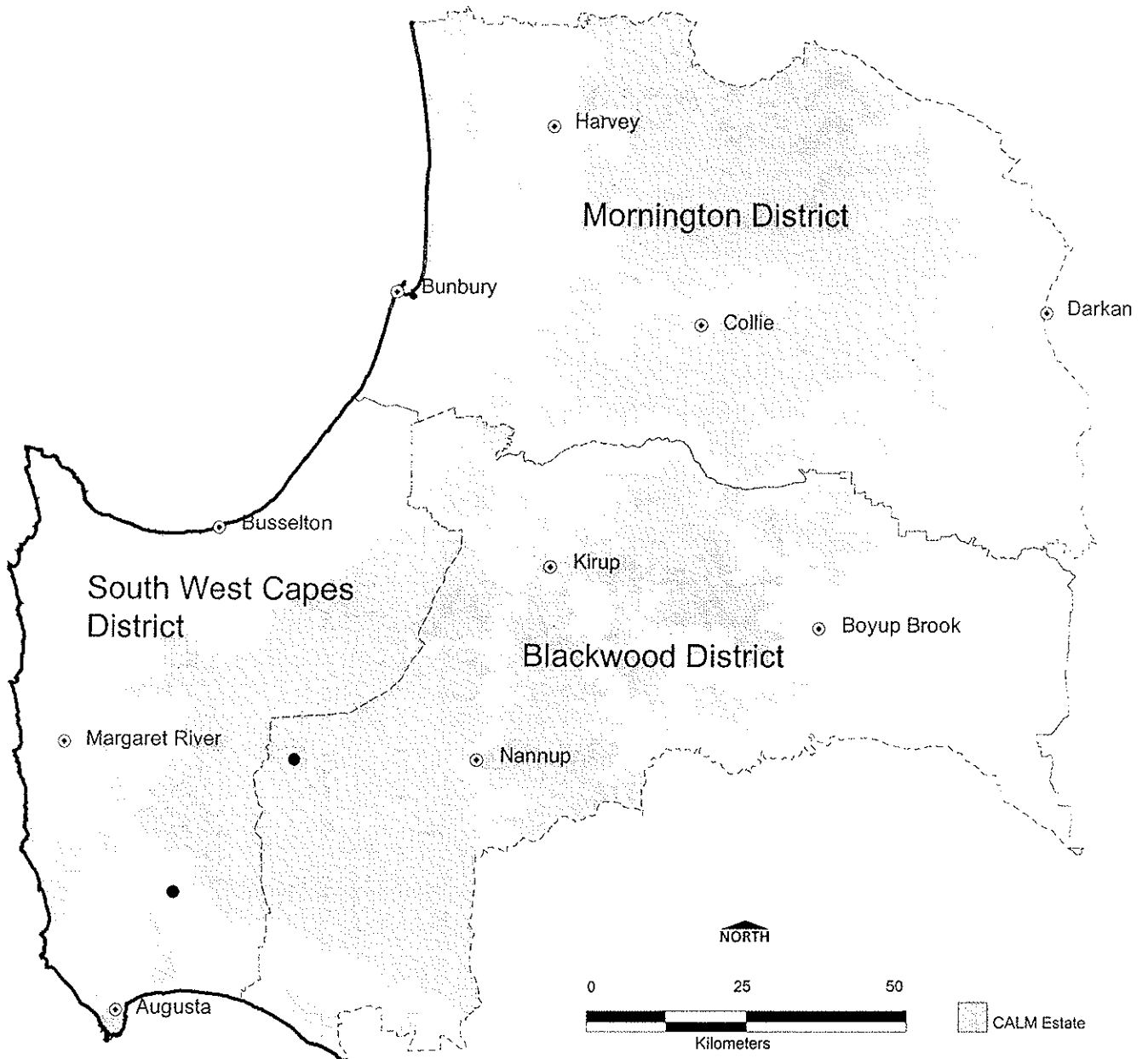
**Susceptibility to *Phytophthora* Dieback**

**Management Requirements**

**Research Requirements**



# Central Forest Region Threatened Flora Management Plan



● *Leptinella drummondii*

## *Leptomeria furtiva* Lepschi

## SANTALACEAE

*Leptomeria furtiva* is an erect, glabrous shrub to 50 cm tall, with angled striate stems and small 2 - 3 mm appressed leaves which are mostly persistent. The bisexual flowers are partly sunken in terminal and lateral thickened spikes (3 - 7 mm long) of 3 - 10 flowers. Each flower is subtended by a lanceolate bract (1 - 2 mm) and has orange-brown tepals 0.5 mm. The fruit is a dry globose drupe, 2 - 3 mm long.

*L. furtiva* is similar to *L. scrobiculata*, but differs from that species in having glabrous not papillose stems, a finer more virgate structure and fewer, less robust spikes. It was first collected in 1840 by Preiss.

**Flowering Period:** August to October

### Distribution and Habitat

Until recently only two populations were recorded; one at Wuljenup Hill near Albany in 1840 and the second at Cowaramup in 1948. Both populations have been searched but the species has not been found. The Albany location now has a quarry situated on it and is surrounded by private land. Soil types and surrounding vegetation were not recorded for these locations. The Swan Coastal Plain survey located a new population south of Busselton in *Melaleuca preissiana* damplands.

### Conservation Status

Priority 2

### Known Populations

| Population    | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Cowaramup   | SWC      | AMR   | -           | 27.2.86     | -             | -         |
| 2 Ambergate   | SWC      | BSN   | Shire       | 10.9.95     | < 20          | -         |
| 3 Scott River | SWC      | AMR   | NP          | 21.1.96     | rare          | -         |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

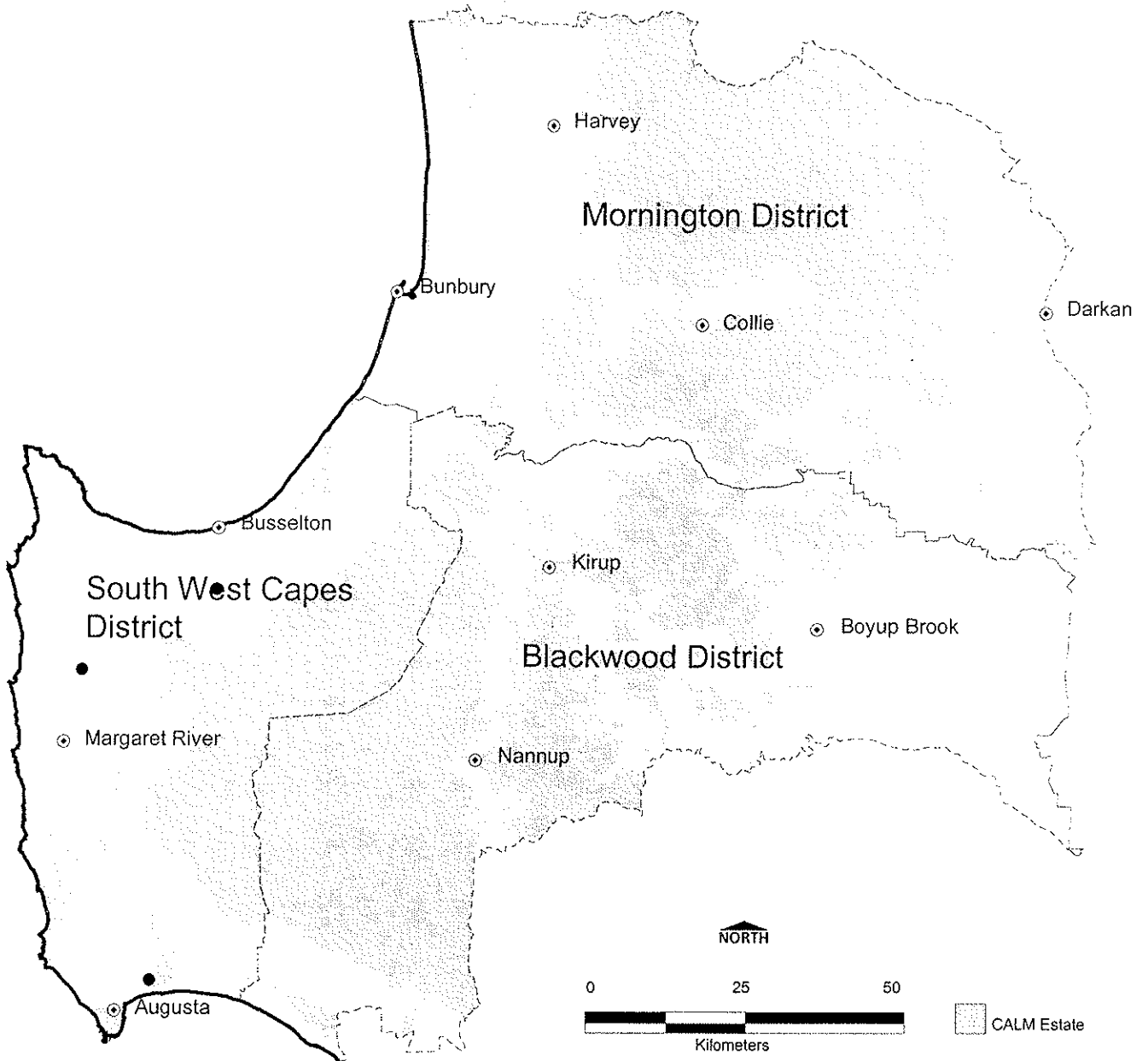
1. Further survey to confirm existence of these populations.

### Research Requirements

### References

Lepschi, B.J. (1999) Taxonomic Revision of *Leptomeria* (Santalaceae). *Australian Systematic Botany* 12, 76-77.

# Central Forest Region Threatened Flora Management Plan



● *Leptomeria furtiva* ms

*Melaleuca incana* R.Br. subsp. *Gingilup* (N. Gibson & M. Lyons 593)

MYRTACEAE

Shrub to ca. 1.8 m. Flowers creamy-yellow.

**Flowering Period:** April to June

**Distribution and Habitat**

Occurs on red-brown sandy-clay over ironstone in a seasonally wet flat. It is fairly common within its range sometimes forming dense, almost mono-specific stands.

**Conservation Status**

Priority 2

**Known Populations**

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| I Gingilup | BWD      | NAN   | NR          | 2.6.95      | common        | good      |

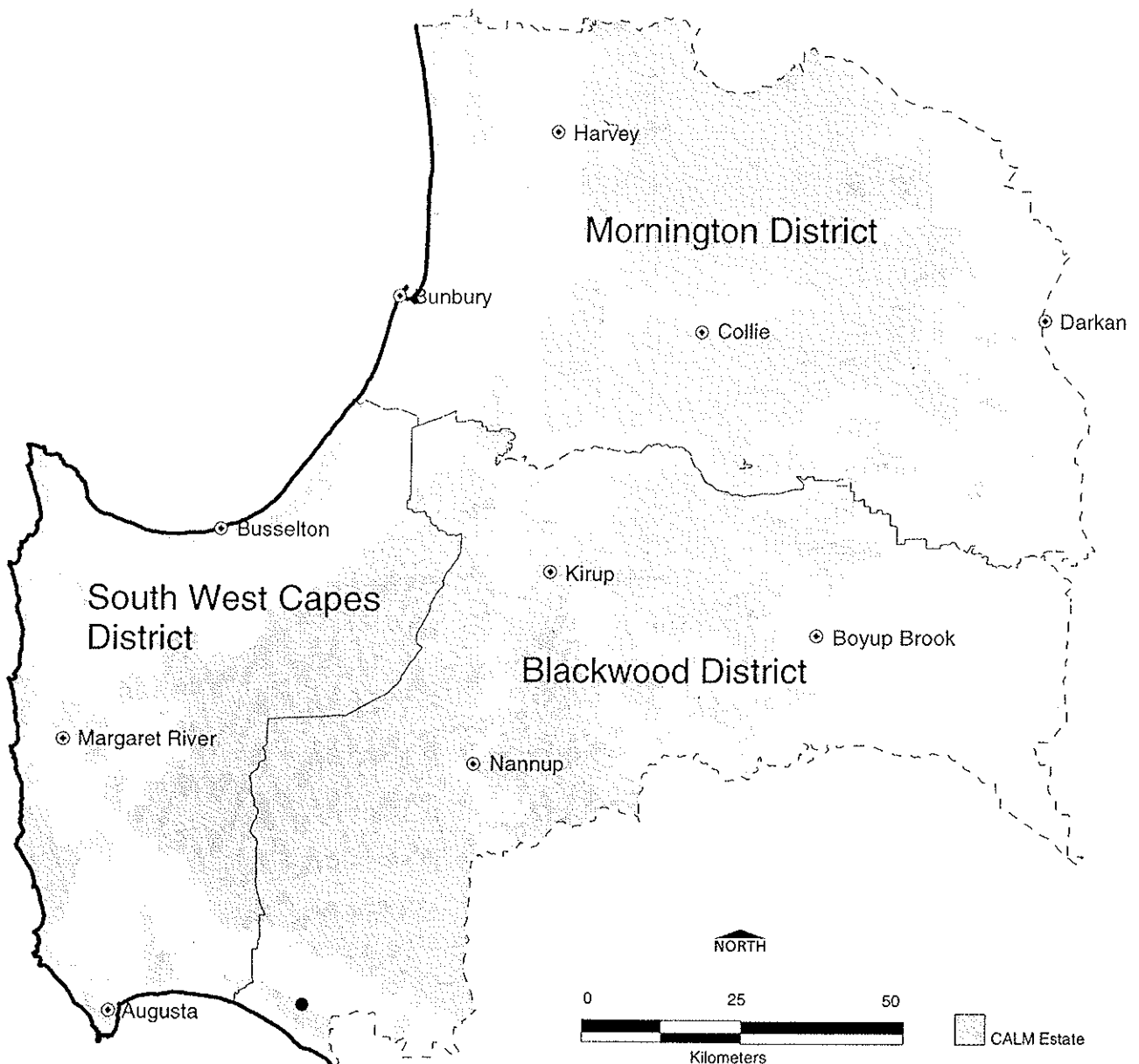
**Response to Disturbance**

**Susceptibility to *Phytophthora* Dieback**

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



- **Melaleuca incana subsp. Gingilup  
(N.Gibson & M.Lyons 593)**

*Millotia tenuifolia* Cass. var. *laevis* P.S. Short

ASTERACEAE

Ascending to erect annual herb to 0.1 m high. Flowers yellow.

**Flowering Period:** September to October

**Distribution and Habitat**

Occurs on the Swan Coastal Plain and northern Jarrah forest over granitic or lateritic soils.

**Conservation Status**

Priority 2

**Known Populations**

| Population    | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Dunsborough | SWC      | BSN   | NP?         | 20.10.82    | -             | -         |

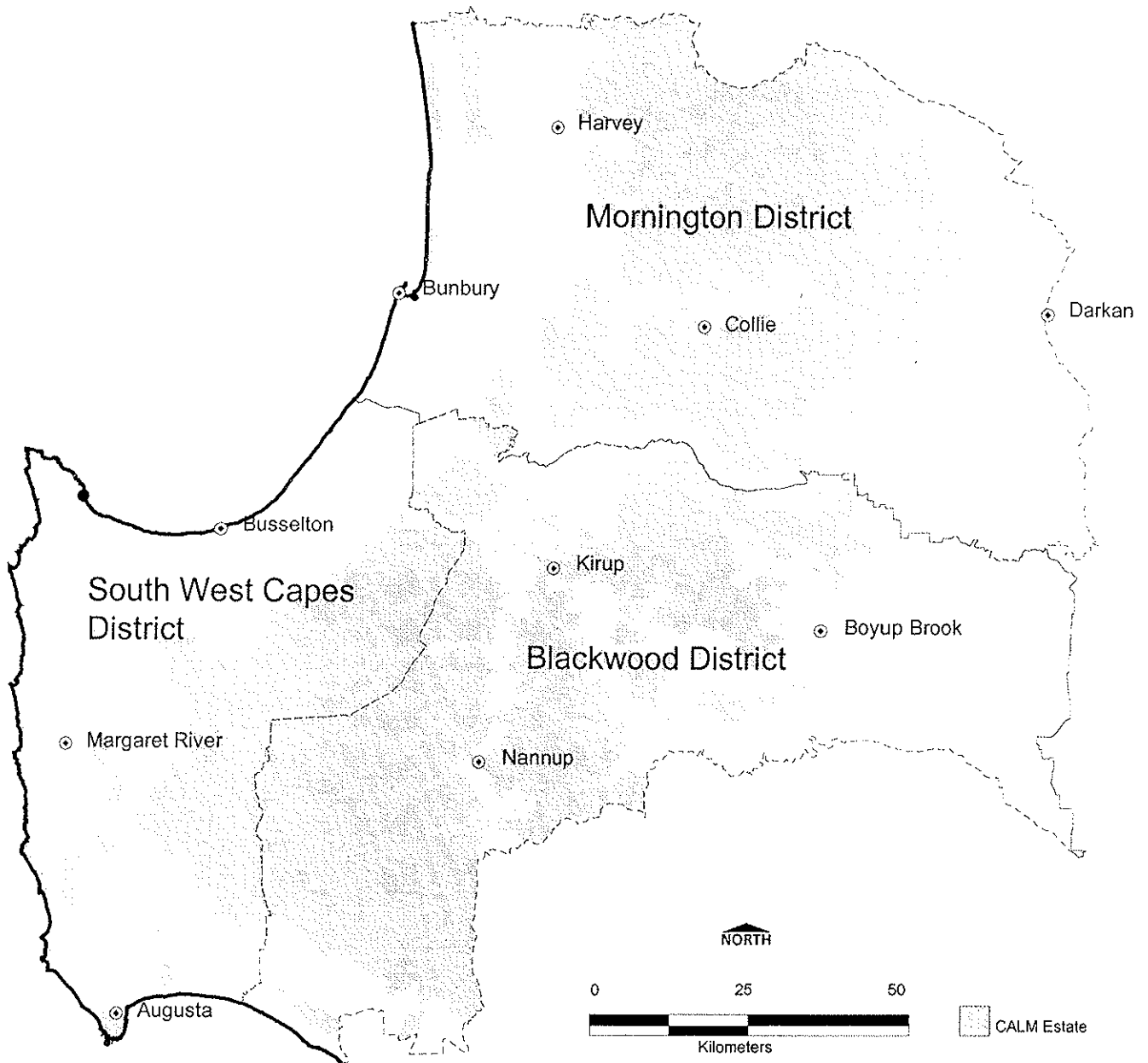
**Response to Disturbance**

**Susceptibility to *Phytophthora* Dieback**

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● *Millotia tenuifolia* var. *laevis*

*Mitreola minima* B.J. Conn

LOGANIACEAE

*Mitreola minima* is a slender, hermaphroditic annual herb. Stipules very reduced and adnate to the base of the paired leaves and forming a shallow sheath. Flowers white; corolla tube often contracted at the throat; lobes 4, much shorter than the tube, valvate. Stamens 4. Ovules 2-celled; ovules several per cell. Styles 3. Fruit a small capsule, opening at the summit.

**Flowering Period:** November to January

**Distribution and Habitat**

Known from Woolbernup Hill in the Fitzgerald National Park, two populations at Walpole in Nornalup National Park and one population at Capel. The Capel population was observed on swampy sand, with an overstorey of Paperbark (*Melaleuca*) and *Nuytsia floribunda*.

**Conservation Status**

Priority 2

**Known Populations**

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Capel    | SWC      | BSN   | -           | 4.1.75      | abundant      | -         |

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

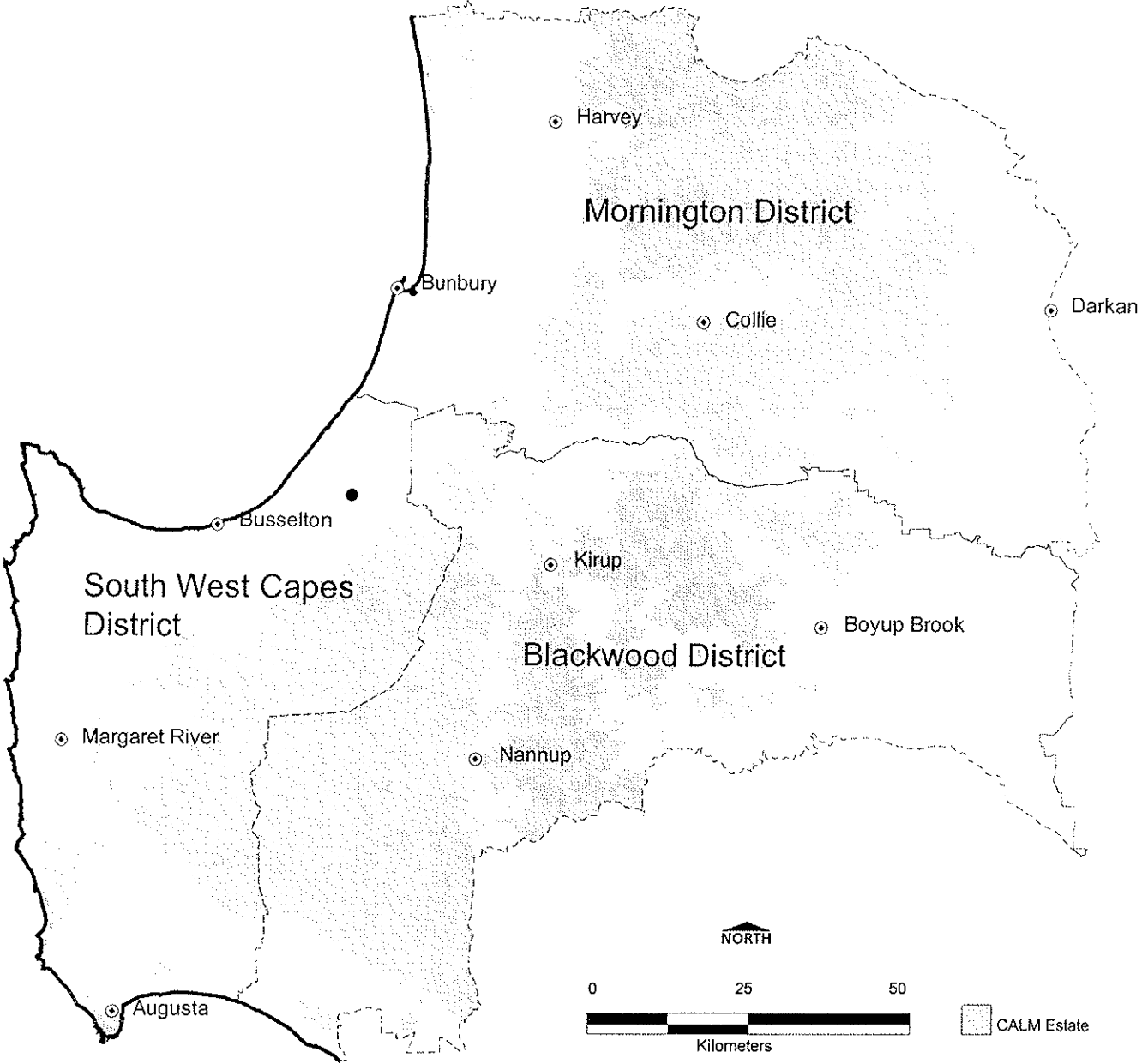
**Management Requirements**

Re-survey population

**Research Requirements**



# Central Forest Region Threatened Flora Management Plan



● *Mitreola minima*

## *Schoenus capillifolius* D.A. Cooke

## CYPERACEAE

A semi-aquatic annual forming dense tufts at the soil surface. A glabrous sedge-like plant with stems repeatedly branching to form dense tufts. The basal leaves are thread-like, up to 10 cm long and supported by the water. The spikelets are one-flowered, sessile (no flower stem) in the leaf tufts or terminating the stem branches. Two closely sheathing (wrapped around) bracts form a tube around the flower and support the stigmas and anther above the water level. The 6 perianth segments have white, silky hairs. The fruit is a fragile, ovoid nut to 1.3 mm long.

This species is related to the aquatic *S. natans* and *S. tenellus* and resembles both species in its almost capillary foliage, reduced inflorescences, and herbaceous glumes, but differs in the greatly abbreviated stems and the one-flowered tubular spikelet. *S. capillifolius* is further distinguished from *S. natans* by the solitary stem and glabrous, obscurely angled nut, and from *S. tenellus* by the presence of hypogynous setae.

### Flowering Period

In spring when the water level begins to lower, and flowering has been observed in November.

### Distribution and Habitat

Upper Swan to Waterloo

Found at Waroona in shallow water in winter wet claypans with associated vegetation of *Melaleuca viminea* shrubland. 2 populations in the Metropolitan area of 100+ plants in good condition; one of the three populations is in an area of proposed development. It is documented that *Schoenus capillifolius* is endemic to the Perth region, however, three populations have now been recorded from outside of this region, at Waterloo, Waroona and Meelan NR east of Pinjarra. This species is very inconspicuous and it is possible that other populations have been undetected. It occurs in winter-wet depressions in clay plans.

### Conservation Status

Priority 2

### Known Populations

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Waterloo | MON      | DAR   | -           | 20.09.83    | common        | good      |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

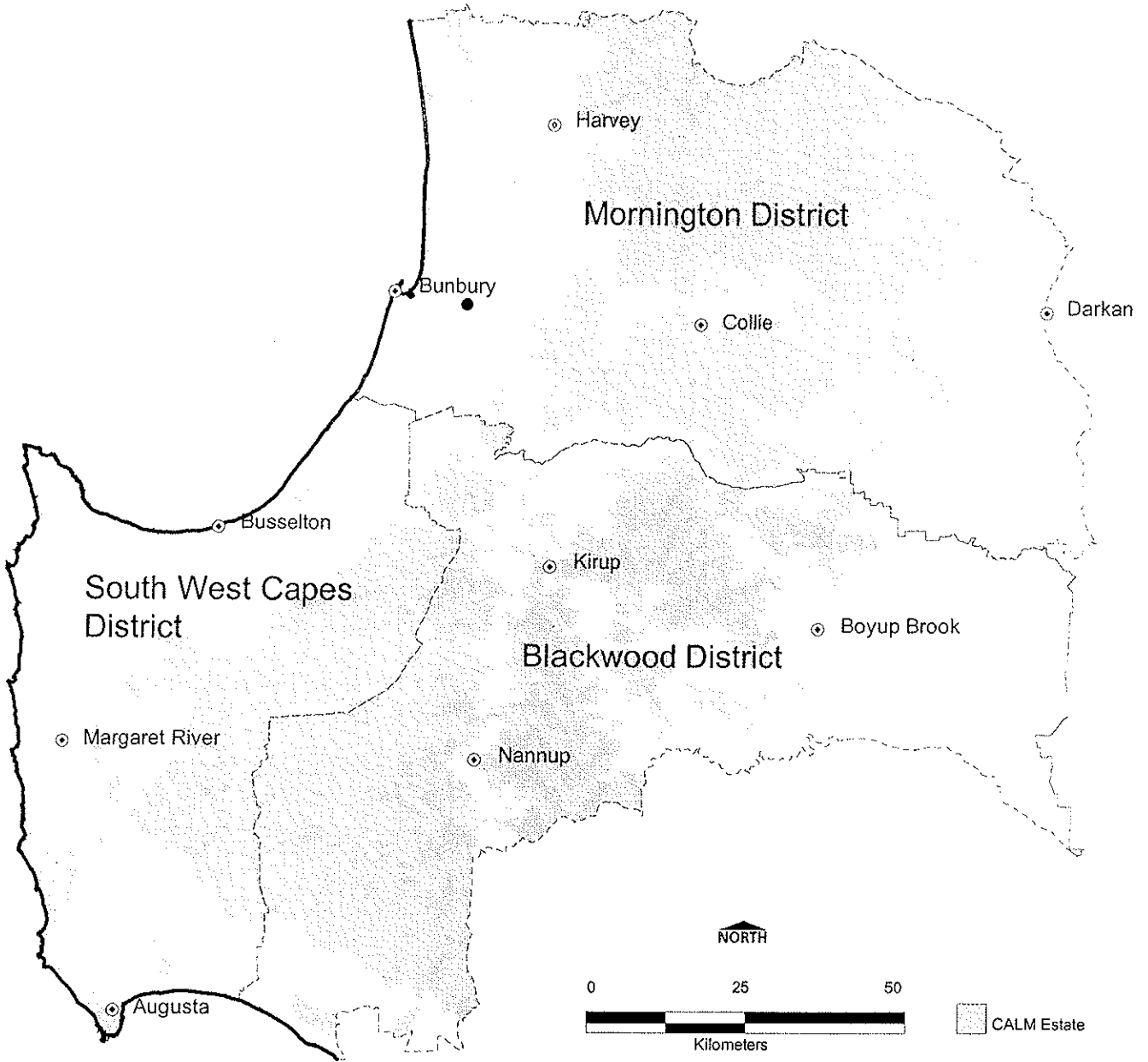
### Research Requirements

Further survey work is required on the Swan Coastal Plain between the Metropolitan and the Waroona populations, as this species is probably more widespread but inconspicuous due to its habit and seasonal nature.

### References

- Cooke, D.A. (1981) New species of *Schoenus* (Cyperaceae) and *Trithuria* (Hydratellaceae). *Muelleria* 4, 299-303.
- Marchant, N.G., Wheeler, J.R., Rye, B.L., Bennett, E.M., Lander, N.S. and Macfarlane, T.D. (1987) *Flora of the Perth Region* Part 2. Western Australian Herbarium, Department of Agriculture, Western Australia.
- Kelly, A.E., Taylor, A., Langley, M.A., Spooner, A. and Coates, D. (1993) *Declared Rare Flora and Other Plants in Need of Special Protection in the Metropolitan Area*. Wildlife Management Program, Department of Conservation and Land Management, Western Australia.

# Central Forest Region Threatened Flora Management Plan



● *Schoenus capillifolius*

*Schoenus loliaceus* Kuek.

CYPERACEAE

Emergent, aquatic, grass-like annual to 0.1 m high. Flowers green.

**Flowering Period:** August to November

**Distribution and Habitat**

Inhabits winter-wet depressions on sandy soils, over clay, in the Scott River National Park and near Ludlow.

**Conservation Status**

Priority 2

**Known Populations**

|   | Population   | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---|--------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 | Scott River  | SWC      | AMR   | NP          | 20.11.90    | -             | -         |
| 2 | Colyoolup Rd | SWC      | CAP   | SF          | 20.10.95    | -             | -         |

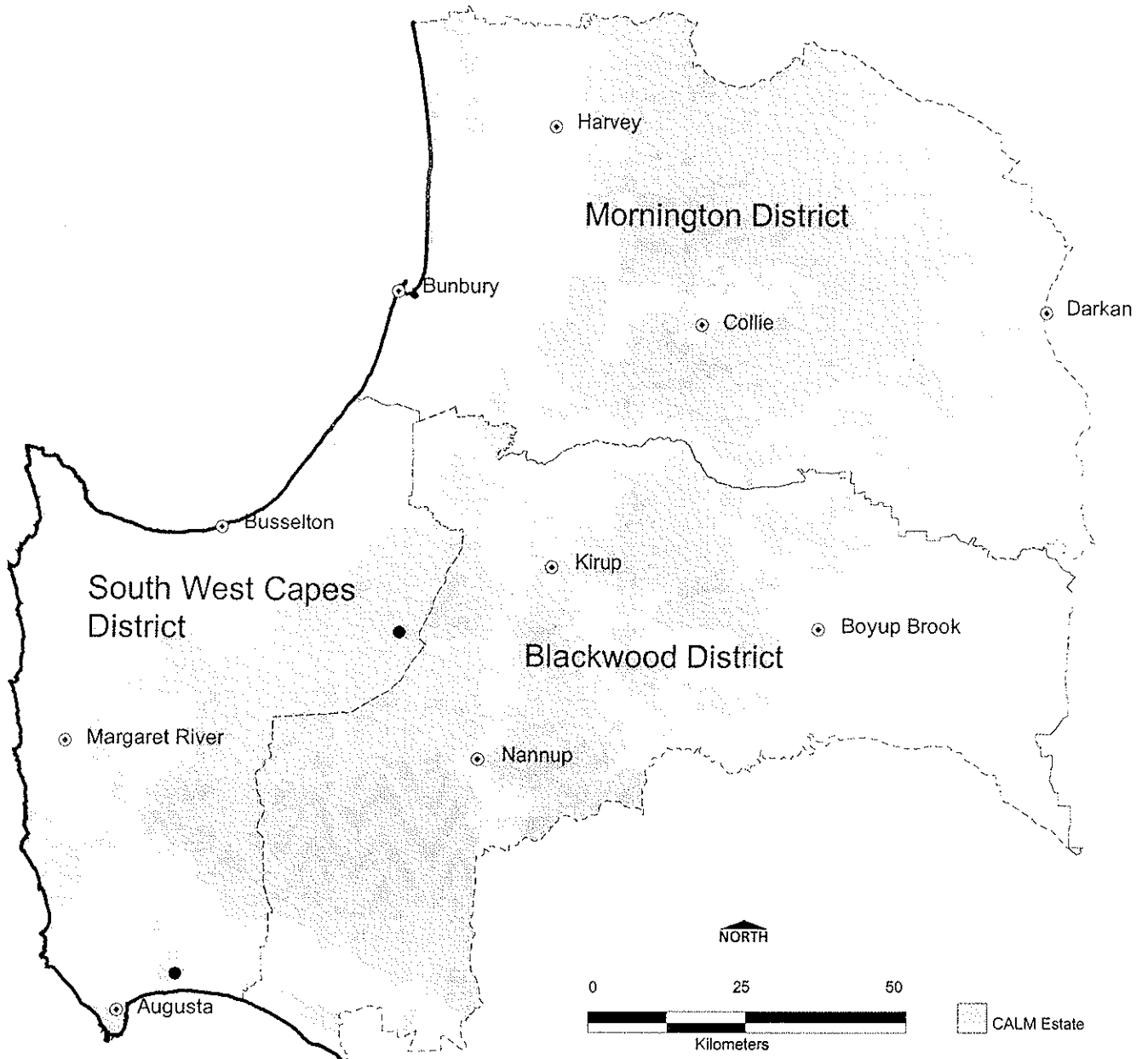
**Response to Disturbance**

Susceptibility to *Phytophthora* Dieback

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● *Schoenus loliaceus*

*Spyridium spadiceum* (Fenzl) Benth.

RHAMNACEAE

Erect slender or weak prostrate shrub to 30 cm high. Flowers white.

**Flowering Period:** August to December, or January to February, or April

**Distribution and Habitat**

Esperance Plains, Jarrah Forest and Warren. The Central Forest Region population was in the Scott National Park east of Augusta. It does not seem to favour a particular habitat.

**Conservation Status**

Priority 2

**Known Populations**

| Population    | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Scott River | SWC      | AMR   | NP          | -           | -             | -         |

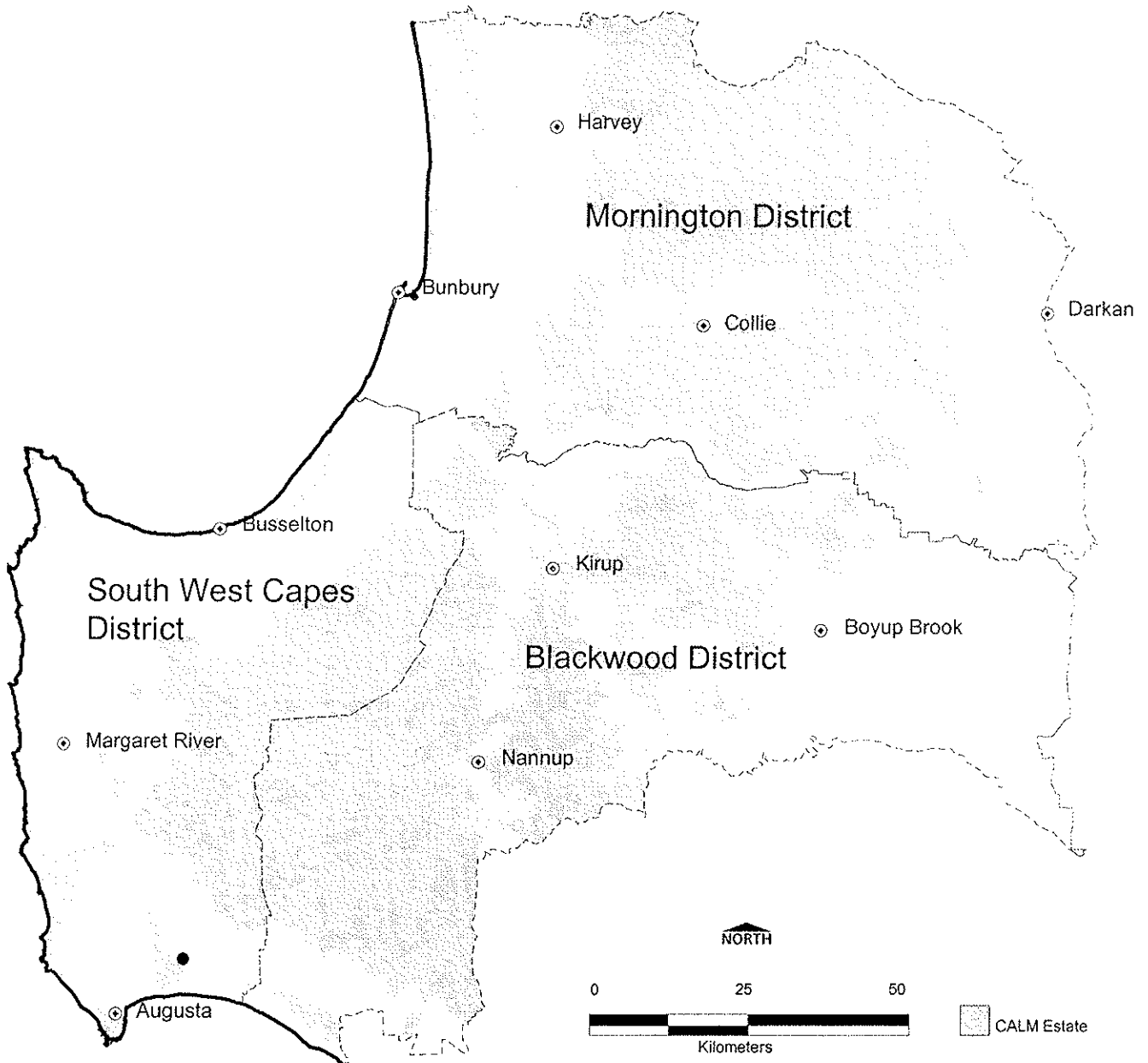
**Response to Disturbance**

**Susceptibility to *Phytophthora* Dieback**

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● *Spyridium spadiceum*

## *Stylidium paulineae* Lowry & Kenneally

## STYLIDIACEAE

Erect perennial herb to 0.13 m high. Flowers pink: petals salmon pink with dark pink border; cream under petals; red markings near throat, yellow in throat. Leaves linear with scale.

**Flowering Period:** September to November

### **Distribution and Habitat**

Occurs on lateritic gravel and loam in open wandoo and jarrah woodland.

### **Conservation Status**

Priority 2

### **Known Populations**

| Population     | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1a Bowelling A | MON      | WEA   | -           | 26.10.94    | occasional    | -         |
| 1b Bowelling B | MON      | WEA   | -           | 31.10.94    | -             | -         |

### **Response to Disturbance**

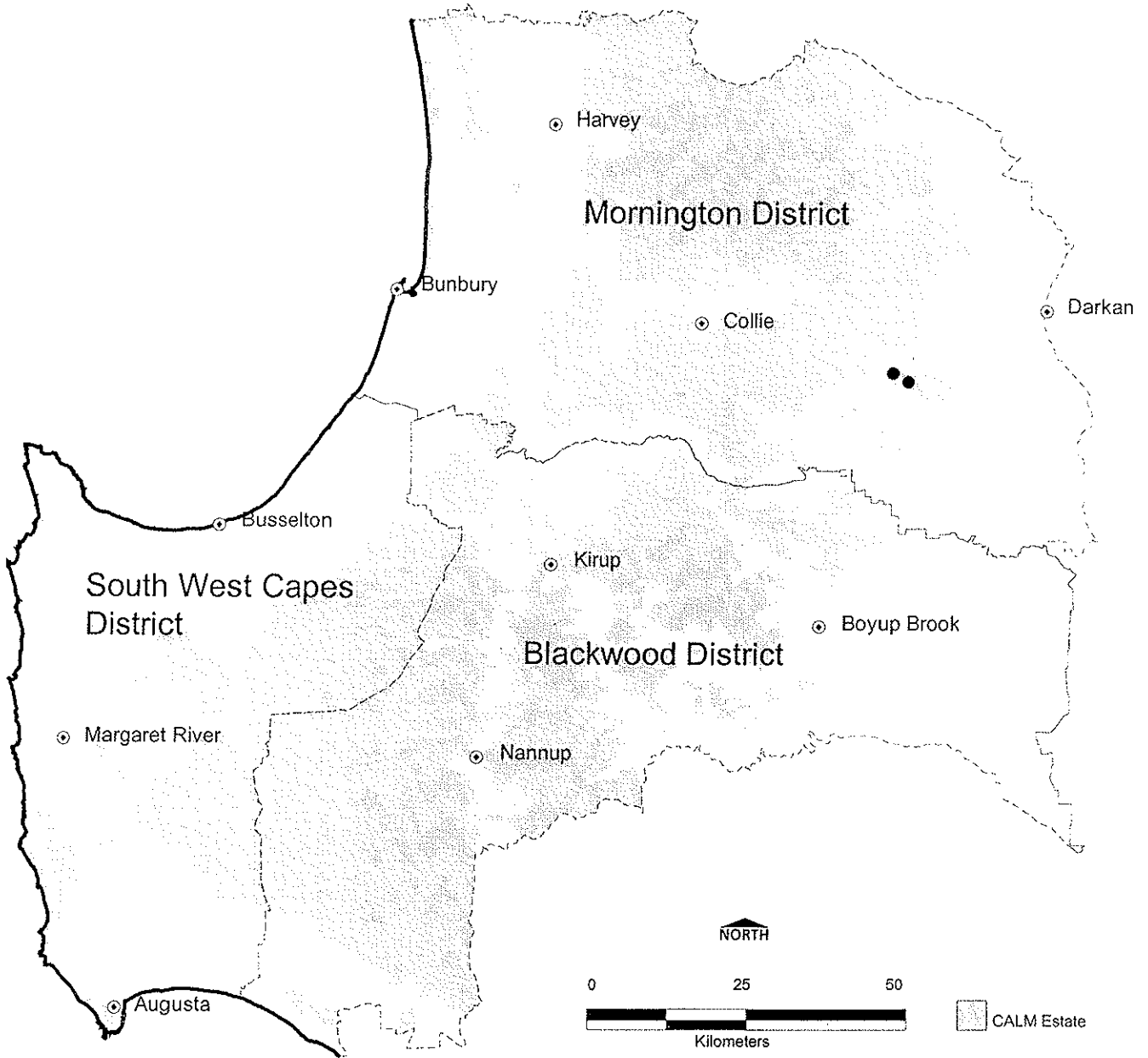
### **Susceptibility to *Phytophthora* Dieback**

### **Management Requirements**

### **Research Requirements**



# Central Forest Region Threatened Flora Management Plan



● *Styloidium paulineae*

*Stylidium rigidifolium* Mildbr.

STYLIDIACEAE

Rosetted, perennial herb to 40 cm high. Flowers pale yellow. Leaves glaucous.

**Flowering Period:** October

**Distribution and Habitat**

Jarrah Forest and Swan Coastal Plain from east of Perth south to Capel.

**Conservation Status**

Priority 2

**Known Populations**

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Capel NR | SWC      | CAP   | NR          | 8.11.92     | -             | -         |

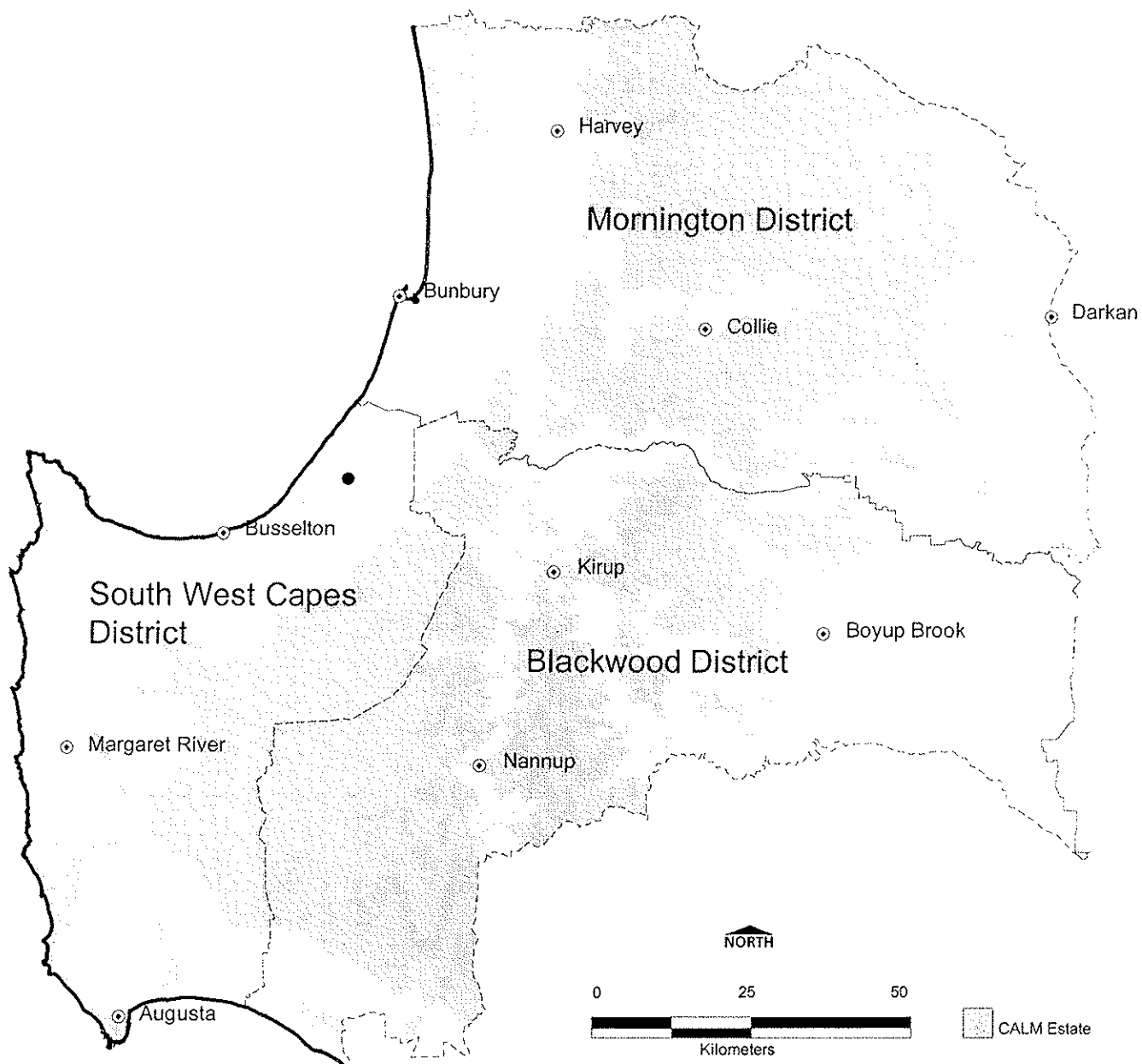
**Response to Disturbance**

**Susceptibility to *Phytophthora* Dieback**

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



● *Stylidium rigidifolium*

## *Synaphea petiolaris* R.Br. subsp. *simplex* A.S.George

## PROTEACEAE

*Synaphea petiolaris* subsp. *simplex* is a low densely clumped small shrub up to approximately 50 cm in height with short thick stems near ground level. The defining feature of this species is the simple leaves; petiole to 13 cm long; lamina obtuse, narrowly obovate 8 – 20 cm long. Inflorescence is a spike 3 – 15 cm long, flowers yellow, widely spaced; peduncle red in colour, simple or branched 7 – 35 cm long, glabrous to puberulous. Stigma horned, 1.1 mm long and wide.

**Flowering Period:** September to October

### Distribution and Habitat

Species is located around the Tutunup and Elgin areas of Busselton, on winter-wet, flat, brown sandy/clay soils over deep ironstone in open Eucalypt and Melaleuca woodlands.

### Conservation Status

Priority 2

### Known Populations

| Population              | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-------------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Ruabon                | SWC      | BSN   | Rail        | 18.8.97     | 30+           | moderate  |
| 2 Ruabon Rd             | SWC      | BSN   | Rail        | 1.10.97     | 20+           | good      |
| 3 Elgin Rd              | SWC      | CAP   | Shire       | 18.8.97     | 3             | moderate  |
| 4 Kaloopup Rd           | SWC      | BSN   | PP          | 25.8.97     | 20+           | good      |
| 5 Ruabon NR             | SWC      | BSN   | NR          | 23.8.93     | -             | -         |
| 6 Ludlow-Hithergreen Rd | SWC      | BSN   | Road        | 1.10.97     | 35            | -         |

### Susceptibility to *Phytophthora* Disease

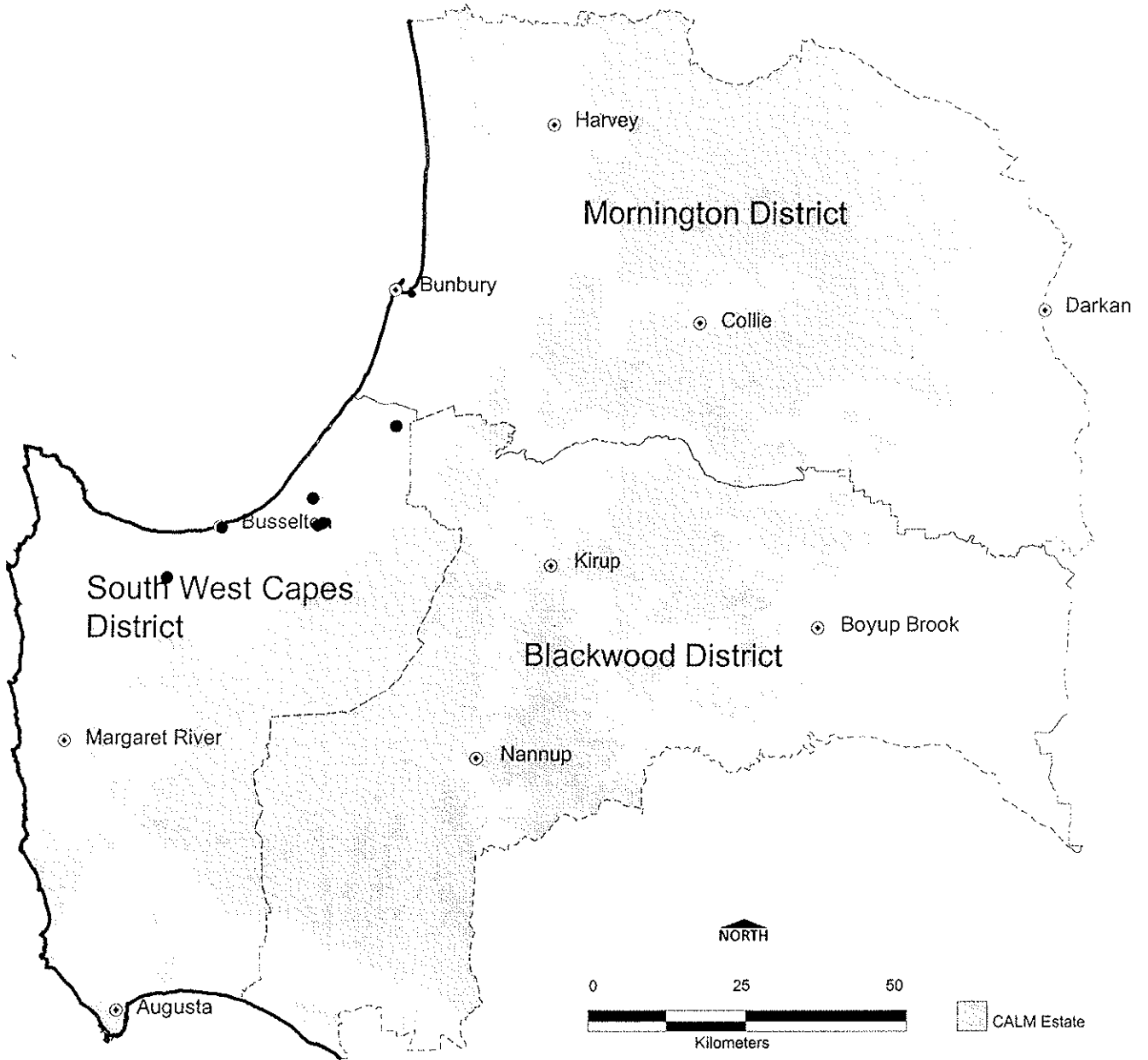
Unknown

### Management Requirements

1. Further survey to determine range of species.

### Research Requirements

# Central Forest Region Threatened Flora Management Plan



● *Synaphea petiolaris* subsp. *simplex*

*Trichocline* sp. Treeton (B.J. Keighery & N. Gibson 564)

ASTERACEAE

Perennial rosetted herb with tuberous rootstock to 1.6 m high. Leaves linear.

**Flowering Period:**

**Distribution and Habitat**

Occurs on sand over limestone and sandy-clay over ironstone in seasonally wet areas.

**Conservation Status**

Priority 2

**Known Populations**

| Population        | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Ironstone Gully | SWC      | BSN   | SF          | 11.11.93    | -             | -         |
| 3 Quinninup Rd    | SWC      | BSN   | NP          | 20.11.96    | -             | good      |
| 8 Wonnerup        | SWC      | BSN   | SF          | 13.12.94    | common        | -         |
| 9 Capel NR        | SWC      | CAP   | NR          | 13.12.94    | common        | -         |

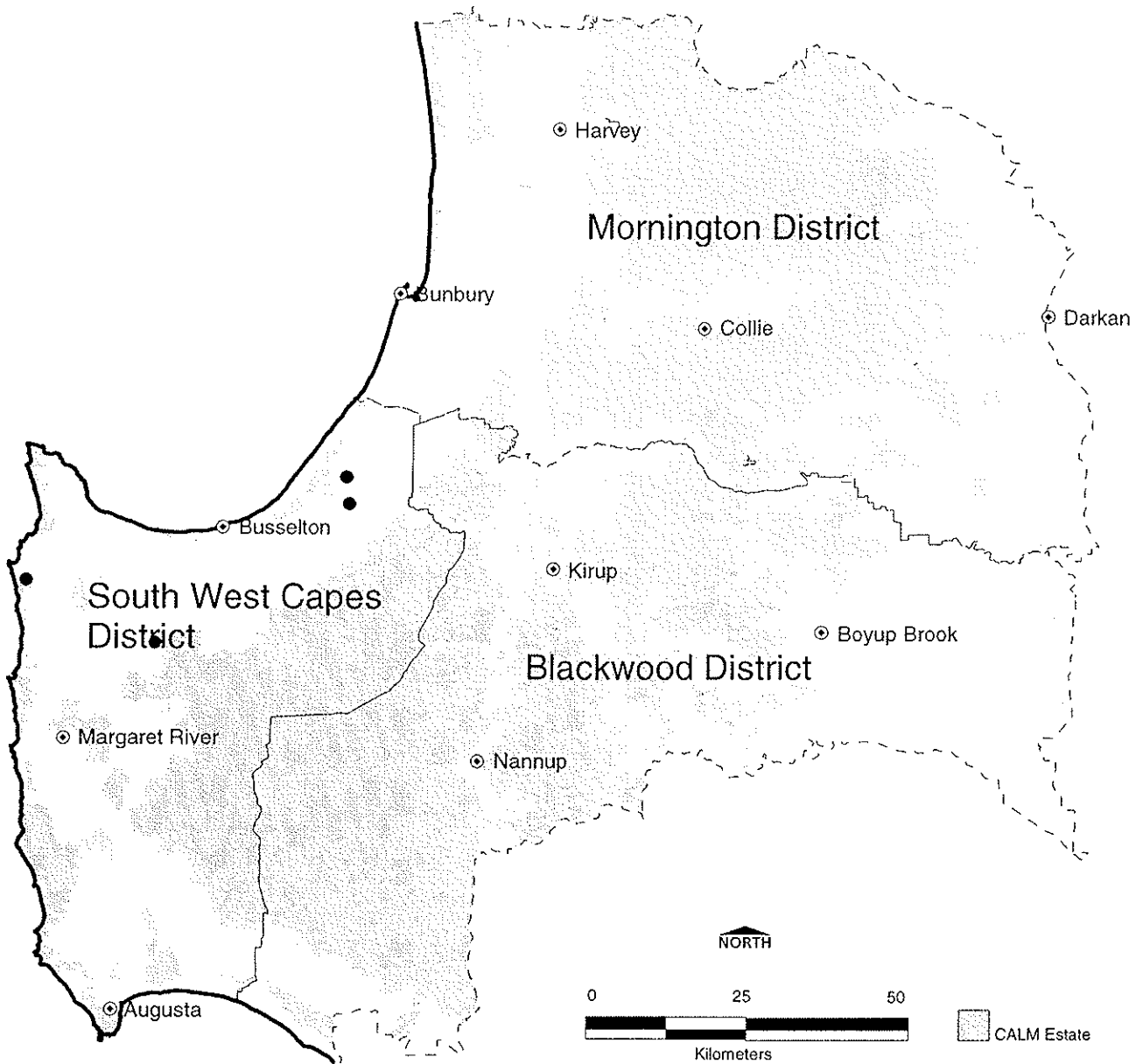
**Response to Disturbance**

**Susceptibility to *Phytophthora* Dieback**

**Management Requirements**

**Research Requirements**

# Central Forest Region Threatened Flora Management Plan



- ***Trichocline* sp. Treeton  
(B.J.Keighery & N.Gibson 564)**

## PRIORITY 3 TAXA



## *Acacia inops* Maiden & Blakely

## MIMOSACEAE

*Acacia inops* is a very weak, scrambling shrub. The green branches are filiform, terete and glabrous, although they are occasionally sparsely puberulous. It has very narrowly triangular and persistent light brown stipules, 1 - 2 mm long. Phyllodes narrowly triangular but unequal at the base due to a short spur on one side. They are deflexed, glabrous, 5 - 7 mm long x 0.5 - 1 mm wide at the broadest point and straight to slightly curved. The flower heads are solitary, axial and on very slender peduncles 3.5 - 5 mm long. Each flower head is comprised of 5 - 9 cream to white flowers approximately 3 mm in diameter. The petals are 1.2 - 1.5 mm long and fused for about one fifth their length.

*Acacia inops* is distinguished from all members of the *A. horridula* group by its weak, thread-like branches, by the prominent deflexing of the phyllodes and their narrowness and by the slender, glabrous peduncles. Originally it was described by Maiden and Blakely as being allied to *A. ingrata*, from which, however, it can be readily distinguished by its 4-sided rather than 5-sided flowers and its weak habit.

**Flowering Period:** October, probably until the end of November.

### Distribution and Habitat

It is restricted to a small area from Margaret River north to Yelverton and east north-east to Osmington. It appears to be restricted to damp areas along creeks and in swamps.

### Conservation Status

Priority 3

### Known Populations

|   | Population       | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---|------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 | Blythe Rd        | SWC      | BSN   | SF          | 27.9.90     | abundant      | -         |
| 2 | Cowaramup        | SWC      | AMR   | -           | 15.10.48    | -             | -         |
| 3 | Margaret River   | SWC      | AMR   | -           | 21.10.1898  | -             | -         |
| 4 | Osmington        | SWC      | AMR   | -           | 21.10.53    | -             | -         |
| 5 | Yallingup Siding | SWC      | BSN   | -           | 3.10.79     | -             | -         |
| 6 | Wall Road        | SWC      | AMR   | Road        | 11.12.96    | -             | -         |
| 7 | Denny Road       | SWC      | AMR   | SF          | 28.10.92    | -             | -         |
| 8 | Davis Road       | SWC      | AMR   | Road        | 23.9.92     | -             | -         |
| 9 | Spearwood Creek  | SWC      | AMR   | SF          | 28.10.92    | -             | -         |

### Response to Disturbance

### Management Requirements

### Research Requirements

### References

Maslin, B.R. (1978) Studies in the genus *Acacia* (Mimosaceae)-8 A revision of the Uninerves-Triangulares, in part (the tetramerous species). *Nuytsia* 2, 266-333.

## *Acacia lateritica* glabrous variant (B.R. Maslin 6765)

## MIMOSACEAE

*Acacia lateritica* (glabrous variant) is an erect, openly branched shrub to 0.8 m but more commonly to 0.4 to 0.5 m tall. Leaves are bipinnate, usually with 2 pinnate pairs. The distal pinnae is longer (6 - 20(mm)), with 2 - 6 pairs of pinnules, whilst the proximal pinnae (2 - 6 mm) has 1 - 3 pairs. The pinnules are flat, narrowly oblong to lanceolate, and usually 4 - 8 mm long with a dark green, shiny upper surface and a paler lower surface. The globular flower heads contain between 24 and 36 light golden flowers,. The dark brown pods are pendulous, almost flat and narrowly oblong. Pods range in size from 3 - 5 cm long and 7 - 11 mm wide and are not constricted between the seeds. The glabrous variant is distinguished by the absence of hairs present on the branchlets and leaves of *A. lateritica*.

*A. lateritica* is closely related to *A. browniana*, and sterile specimens can be confused with *A. browniana* var. *obscura* in the Manjimup district where their distributions overlap. However it can be distinguished by the larger flower heads, which contain more flowers and generally have longer peduncles and pinnules.

**Flowering Period:** Glabrous variant unknown, *A. lateritica* flowers from June to October.

### Distribution and Habitat

*Acacia lateritica* (glabrous variant) is only known from a small area surrounding Dunsborough, growing in lateritic soil in Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) forest or with Marri and *A. pulchella*

### Conservation status

Priority 3

Although observed to be common at two of the three locations, this variant is restricted to a small area, which is subject to both commercial and private development.

### Known Populations

| Population        | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Meclup Reg Park | SWC      | BSN   | Shire       | 5.9.97      | 1000's        | good      |
| 2. YARL03         | MON      | HVY   | -           | 14.10.90    | -             | -         |
| 3. Scott NP       | SWC      | AMR   | NP          | 21.9.90     | common        | -         |
| 4 Bramley Block   | SWC      | AMR   | SF          | 26.9.97     | 1000's        | good      |
| 5 Loc 3859        | SWC      | AMR   | PP          | 6.1.98      | 100's         | good      |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown, but unlikely to be susceptible.

### Management Requirements

1. Regular monitoring.
2. Liaison with landowners and relevant government bodies.

### Research Requirements

## *Acacia lullfitziorum* Maslin

## MIMOSACEAE

Spreading to sprawling, mat-forming, spinose shrub, 0.2 – 0.7 m high, 0.4 – 1.3 m wide. Flowers yellow.

**Flowering Period:** August to early October

### **Distribution and Habitat**

It occurs mainly from the Arthur River south to near Cranbrook, and east to the eastern boundary of the Stirling Range National Park and Ongerup. Known from clay, sandy clay and gravelly loam, usually in *Eucalyptus wandoo* woodland, but also in *Acacia acuminata* – *Allocasuarina* tall shrubland.

### **Conservation Status**

Priority 3

Although it appears widely distributed, most locations from which it has been collected are in towns or farming areas.

### **Known Populations**

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Wahkinup | BWD      | BOY   | -           | 28.2.89     | occasional    | -         |

### **Response to Disturbance**

### **Management Requirements**

### **Research Requirements**

## *Acacia semitrullata* Maslin

## MIMOSACEAE

*Acacia semitrullata* is a rather weak shrub 0.3 - 1 m tall, either single stemmed or dividing at ground level into a number of slender orange-brown branches. The branchlets are terete with yellowish fine nerves and are sparsely to densely covered by soft to rigid hairs. It has very narrowly triangular, persistent brown stipules, 1 - 2 mm long. The medium to dark green phyllodes are normally narrowly semitrullate, 5 - 10 mm long x 3 - 2 mm wide (at the broadest point), spreading or sometimes deflexed, glabrous and normally straight. The globular flower heads are solitary on moderately to densely puberulous peduncles 3 - 8 mm long. They are comprised of 5 - 8 cream to white flowers. The petals are 1.5 mm long and fused for about half of their length. The legumes are red brown, terete, grow to 60 mm long x 2 - 3 mm wide and are curved and tapered at both ends.

**Flowering Period:** May to September

### Distribution and Habitat

*A semitrullata* is located in the south-west of Western Australia, extending from the Whicher Range (between Busselton and Nannup) north east to the Donnybrook area and nor-nor west to near Harvey. It has frequently been collected in areas adjacent to swamps or in slight depressions in sandy soils or sand on laterite. Vegetation is commonly Jarrah/Marri woodland, with an understorey canopy of *Banksia* species, and a low shrub storey.

### Conservation Status

Priority 3

### Known Populations

| Population                      | District | Shire | Land Status  | Last Survey | No. of Plants        | Condition |
|---------------------------------|----------|-------|--------------|-------------|----------------------|-----------|
| 1 Harvey 1, SCP (GUTHRIE05, 06) | MON      | HVY   | -            | 7.12.76     | scattered but common | -         |
| 2 Donnybrook                    | BWD      | DBK   | -            | 9.12.75     | 5+                   | -         |
| 3 Elgin                         | MON      | CAP   | -            | 27.8.52     | -                    | -         |
| 4 S of Busselton                | SWC      | BSN   | -            | 21.8.76     | 1                    | -         |
| 5 Myalup                        | MON      | HVY   | SF           | 21.6.67     | -                    | -         |
| 6 Whicher Range                 | SWC      | AMR   | -            | 28.7.85     | 1                    | -         |
| 7 Harvey 2                      | MON      | HVY   | -            | 31.8.54     | 200+                 | -         |
| 8 Ruabon 2                      | SWC      | BSN   | Rail         | 12.8.86     | 10+                  | -         |
| 9 Bunbury - Boyanup 1           | MON      | CAP   | -            | 5.6.83      | scattered            | -         |
| 10 Whicher Range                | SWC      | BSN   | NR           | 27.07.90    | >20                  | -         |
| 11 E of Donnybrook              | BWD      | DBK   | -            | 01.08.70    | -                    | -         |
| 12 Harvey River                 | MON      | HVY   | -            | -           | scattered            | -         |
| 13 Harvey - Myalup              | MON      | HVY   | -            | 20.8.76     | 30+                  | -         |
| 14 Collie Basin                 | MON      | COL   | ?Private-    | 21.8.79     | 2000+                | -         |
| 15 Kilpatricks                  | MON      | CAP   | -            | 20.8.76     | -                    | -         |
| 16 E of Yallingup               | SWC      | BSN   | -            | 11.8.80     | -                    | -         |
| 17 Bunbury - Boyanup 2          | MON      | CAP   | R7684, A1167 | 24.8.84     | 400+                 | -         |
| 18 Lowden                       | BWD      | DBK   | -            | 1913        | common               | -         |
| 19 W of Yarloop                 | MON      | HVY   | R7684        | 20.8.78     | 50+                  | -         |
| 20 NW of Brunswick              | MON      | HVY   | --           | 1.84        | -                    | -         |
| 21 SW of Capel SCP (CAPEL02)    | SWC      | CAP   | NR16144      | 10.9.84     | 84                   | -         |
| 22 Australind                   | MON      | HVY   | ?PP          | -           | -                    | -         |
| 23 Wonnerup Rd                  | SWC      | BSN   | R16144       | -           | -                    | -         |
| 24 Treedale-Stanley Rds         | MON      | HVY   | Road         | 8.6.93      | 8+                   | -         |
| 25 N or Riverdale Rd            | SWC      | BSN   | -            | -           | -                    | -         |
| 26 S of Marriot Rd              | SWC      | BSN   | -            | -           | -                    | -         |
| 27 S of Bussell Hwy             | SWC      | BSN   | -            | -           | -                    | -         |
| 28 Salom                        | -        | -     | ?NR          | 10.6.87     | scattered            | -         |
| 29 SCP (ACTON01)                | SWC      | BSN   | -            | -           | -                    | -         |
| 30 SCP (DARD02)                 | MON      | DAR   | -            | -           | -                    | -         |
| 31 SCP (CARB03)                 | SWC      | BSN   | -            | -           | -                    | -         |
| 32 SCP (KEME03)                 | MON      | HVY   | -            | -           | -                    | -         |

## **Response to Disturbance**

## **Management Requirements**

## **Research Requirements**

## **References**

Maslin, B.R. (1978) Studies in the genus *Acacia* (Mimosaceae)-8 A revision of the Uninerves-Triangulares, in part (the tetramerous species). *Nuytsia* 2, 266-333.

*Actinotus* sp. Walpole (J.R. Wheeler 3786)

APIACEAE

Prostrate perennial herb to 4 cm high and 20 cm wide. Flowers white.

**Flowering Period:** January to March

**Distribution and Habitat**

Occurs on sandy clay and mud in valleys amongst Karri from Boranup to Walpole.

**Conservation Status**

Priority 3

**Known Populations**

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Boranup  | SWC      | AMR   | NP          | 10.2.93     | occasional    | -         |

**Response to Disturbance**

**Management Requirements**

**Research Requirements**

## *Adenanthos cygnorum* Diels subsp. *chamaephyton* E.C. Nelson

## PROTEACEAE

*Adenanthos cygnorum* subsp. *chamaephyton* is a prostrate shrub up to 4 m in diameter with short appressed hairs on the branches, becoming glabrous at the branch tips. The leaves are divided into three segments, up to 20 mm long, with the longest leaves at the tips of branches around the inflorescences. Each lateral leaf segment is further divided in two, resulting in five terete lobes. An indumentum of both short curled and long divaricate hairs is present on young leaves, which become increasingly glabrous with age. However the indumentum usually persists on the leaf petioles. The flowers are terminal and usually solitary or in small groups on short (c.1 mm) hairy peduncles. The flowers range from pallid pink and green, to cream and green, to almost all green, with perianth ca. 22 mm long and short hairs on the exterior of the tepals only. Nelson (1978) differentiated between *A. cygnorum* subsp. *chamaephyton* and the common *A. cygnorum* subsp. *cygnorum* primarily based upon their prostrate and erect habits respectively. Additional minor differences are that subsp. *chamaephyton* tends to have smaller flowers and a pointed perianth limb. There is no major difference in leaf morphology, which can be used to separate the two subspecies. The subsp. *chaemophyton* was originally described as *A. tegea* by A.S. George in 1974.

Historically *A. cygnorum* and *A. sericea* have often been confused and indeed *A. cygnorum* was earlier regarded as a variety of *A. sericea*. However the two species are geographically distinct, with *A. sericea* restricted to coastal habitats in the south of the state. Morphologically *A. sericea* can be distinguished by its scarlet flowers, the absence of curled hairs and greater number of leaf segments (usually twelve).

**Flowering Period:** November to January

### Distribution and Habitat

This subspecies is confined to a few populations at Mundaring, Muchea, Bindoon and Chidlow, and to two populations in the Central Forest Region; one near Collie and another approximately 15 km south-east at Muja Power Station.

Populations at Bindoon, Muchea and Chidlow were recorded in lateritic soils within semi-cleared Jarrah forest (Chidlow) and low *Allocasuarina humilis*/*Calothamnus sanguinus*/*Hibbertia hypericoides* heath (Bindoon). Nelson (1978) noted its common occurrence as an undershrub in *Eucalyptus marginata* forest associated with *A. barbiger*. The Muja population was recorded in upland sandy soil in Jarrah- Marri forest with *Allocasuarina fraseriana*.

### Conservation Status

Priority 3

Although reported as locally common at the Muchea population, abundance and condition are unknown for all other populations. The land status of the Collie population is not stated, however the Muja Power Station population is adjacent to a haul road and is therefore vulnerable.

### Known Populations

| Population           | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|----------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Muja Power Station | MON      | COL   | -           | 10.12.79    | -             | -         |
| 2 Collie             | MON      | COL   | -           | 20.7.75     | -             | -         |

### Response to Disturbance

George (1984) noted that *A. cygnorum* subsp. *chaemophyton* tends to resist burning due to its habit, and has a protective effect on other plants growing within the spreading foliage.

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

1. Resurvey existing populations to establish current condition.
2. Liaise with relevant bodies.
3. Survey appropriate habitat and vegetation types in adjacent areas to establish extent of distribution.

## Research Requirements

### References

- Nelson, E.C. (1978) A taxonomic revision of the genus *Adenanthos* (Proteaceae). *Brunonia* 1, 303-406.
- George, A.S. (1974) Five new species of *Adenanthos* (Proteaceae) from Western Australia. *Nuytsia* 1, 381-386.



*Andersonia amabile* Lemson **ms**

EPACRIDACEAE

Compact shrub, 0.08 – 0.3 m high. Flowers pink.

**Flowering Period:** October to December

**Distribution and Habitat**

This species occurs on grey or black peaty sand or loam, inhabiting creek banks, swamp edges or seasonally wet flats. It grows in Jarrah forests in the South-west and Warren districts.

**Conservation Status**

Priority 3

**Known Populations**

| Population    | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Black Point | BWD      | NAN   | NP          | 31.10.90    | -             | -         |
| 2 Gingilup    | BWD      | NAN   | NR          | 20.11.91    | -             | -         |

**Response to Disturbance**

**Management Requirements**

**Research Requirements**

## *Aotus cordifolia* Benth.

## PAPILIONACEAE

*A. cordifolia* is an erect or straggling shrub growing to about 1.5 m with branches loosely pubescent with fine, spreading hairs. The heart-shaped leaves occur in whorls of three, sessile on the branches or with very short petioles. The leaf apex is acute and the margins are thickened, undulate to toothed and sometimes slightly recurved. The flowers occur sparsely in the leaf axis, either singly or 2 or 3 together on very short pedicels. The calyx is slightly hairy and 2 - 3 mm long. The corolla is yellow with a dark keel. The pods are brown, very compressed and broadly elliptic to circular in outline, 2.5 - 3 x 2.5 mm.

**Flowering Period:** August to December

### Distribution and Habitat

Known from a number of locations from both the Coastal Plain and Darling Range near Perth, Dwellingup and a single population near Witchcliffe on the Nindup Plain. It occurs in swampy or damp sandy soil, in dense low scrub dominated by *Astartea fascicularis* (Witchcliffe population).

### Conservation Status

Priority 3

### Known Populations

|   | Population     | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---|----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 | Nindup Plain   | SWC      | AMR   | Road        | 25.5.95     | 20            | -         |
| 2 | Bruce Road     | SWC      | AMR   | NP          | 17.11.92    | -             | -         |
| 3 | Blackwood Road | SWC      | AMR   | SF          | -           | -             | -         |

### Response to Disturbance

### Management Requirements

### Research Requirements

### References

- Bentham, G. (1837) *Enumeratio Plantarum in Novae Hollandiae ora Austro-occidentali*, p33.  
Marchant, N.G., Wheeler, J.R., Rye, B.L., Bennett, E.M., Lander, N.S. and Macfarlane, T.D. (1987) *Flora of the Perth Region* Part 2. Western Australian Herbarium, Department of Agriculture, Western Australia.

*Blennospora* sp. Ruabon (B.J. Keighery & N. Gibson 20)

ASTERACEAE

Erect annual, herb, 0.04 – 0.1 m high. Flowers yellow.

**Flowering Period:** October to November.

**Distribution and Habitat**

Grows on clay and sandy clay in seasonally wet flats on the Swan Coastal and Scott Plains.

**Conservation Status**

Priority 3

**Known Populations**

|   | Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 | Ruabon NR          | SWC      | BSN   | NR          | 3.11.93     | -             | -         |
| 2 | Fish Road NR       | SWC      | BSN   | NR          | 14.10.92    | -             | -         |
| 3 | Scott River        | SWC      | AMR   | Shire       | 1.11.90     | -             | -         |
| 4 | Ellis Road         | MON      | HVY   | NP          | -           | -             | -         |
| 5 | Yoongarrillup Road | SWC      | BSN   | Road        | 14.10.92    | -             | -         |
| 6 | Wonnerup Road      | SWC      | BSN   | Road        | 9.11.87     | abundant      | -         |

**Response to Disturbance**

**Management Requirements**

**Research Requirements**

*Boronia anceps* Paul G. Wilson

RUTACEAE

Perennial, herb to 0.6 m high. Lacking lignotuber, stem flattened and ancipitous when young. Flowers pink or pink to purple.

**Flowering Period:** September to December or January.

**Distribution and Habitat**

Occurs on white sand and gravelly laterite in seasonally swampy heaths.

**Conservation Status**

Priority 3

**Known Populations**

| Population            | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Scott River Road    | SWC      | AMR   | Road        | 16.11.82    | -             | -         |
| 2 Tutunup Road        | SWC      | CAP   | Road        | 28.11.96    | loc common    | -         |
| 3 Bunkers Bay         | SWC      | BSN   | NP          | 29.10.83    | -             | -         |
| 4a Reserve 12951      | SWC      | AMR   | Shire       | 03.12.90    | uncommon      | -         |
| 4b Scott NP           | SWC      | AMR   | NP          | 22.10.97    | frequent      | -         |
| 5a Scott River Road N | SWC      | AMR   | Road        | 22.10.97    | frequent      | -         |
| 5b BHP Beenup         | SWC      | AMR   | PP          | 19.01.96    | frequent      | good      |

**Response to Disturbance**

**Management Requirements**

**Research Requirements**

## *Boronia tetragona* Paul G. Wilson

## RUTACEAE

Perennial, herb to 0.3 – 0.7 m high. Leaves sessile, entire with papillate margins. Branches quadrangular, sepals ciliate. Flowers pink and red.

**Flowering Period:** October to December.

### **Distribution and Habitat**

Occurs on white/black sand, laterite and brown sandy loam in winter-wet flats and swamps amongst open woodland.

### **Conservation Status**

Priority 3

### **Known Populations**

|   | Population        | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---|-------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 | Plantation Road   | SWC      | CAP   | Road        | 5.12.74     | -             | -         |
| 2 | Whicher Range     | SWC      | BSN   | SF          | 26.11.75    | -             | -         |
| 3 | Cowaramup         | SWC      | AMR   | -           | 18.10.67    | -             | -         |
| 4 | Ambergate Reserve | SWC      | BSN   | Shire       | 18.10.94    | loc. common   | -         |
| 5 | Capel NR          | SWC      | CAP   | NR          | 20.10.94    | common        | -         |

### **Response to Disturbance**

### **Management Requirements**

### **Research Requirements**

*Bossiaea disticha* Lindl.

PAPILIONACEAE

This species was first described by Lindley in 1841. It is an open to medium dense shrub to 1.5 m with spreading branches, which tend to weep towards the ground. The leaves are ovate or oblong and up to 13 mm long, arranged alternately along the branches. The flowers are yellow on the standard petal and the tips of the wings, with the keel and the remainder of the wings a brown-red. The tips of the upper calyx lobes are truncated. The ovary is glabrous.

Note: the above description obtained by a combination of B & G and collectors notes. Formal description published in Edwards Bot. Reg. 27:misc. 38 (1841) and may thus be difficult to obtain.

**Flowering Period:** September to November

**Distribution and Habitat**

It has been recorded from Augusta to Margaret River, mainly in sandy soils on limestone, but also from sandy clay over granite, in Marri/Jarrah and Karri forest.

**Conservation Status**

Priority 3

**Known Populations**

|   | Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 | Forest Grove Rd    | SWC      | AMR   | NP          | 3.10.97     | 1000's        | good      |
| 2 | Caves Rd           | SWC      | AMR   | NP          | 5.10.86     | -             | -         |
| 3 | Shire Reserve 8431 | SWC      | AMR   | Shire       | 15.10.95    | -             | -         |
| 4 | Ellen Brook Rd     | SWC      | AMR   | NP          | -.10.96     | 1000's        | good      |
| 5 | Cape Freycinet     | SWC      | AMR   | NP          | 31.10.90    | -             | -         |
| 6 | Bruce Rd           | SWC      | AMR   | NP          | 11.11.92    | -             | -         |
| 7 | Leeuwin Rd         | SWC      | AMR   | NP          | 25.2.98     | 1000's        | good      |
| 8 | Wilderness Drive   | SWC      | AMR   | Shire       | 5.10.87     | -             | -         |
| 9 | Boranup Drive      | SWC      | AMR   | NP          | 25.2.98     | 1000's        | good      |

**Response to Disturbance**

Killed by fire but, has regenerated successfully after fire from seed.

**Management Requirements**

Abundant in Boranup Forest and LNNP. Introduced on the Scott Plains.

**Research Requirements**

**References**

Keighery, G.J. (1996) Boranup *Bossiaea* (*Bossiaea disticha*): Distribution and biology. *Western Australian Naturalist* 21, 97-101.

*Calytrix pulchella* B.D. Jacks.

MYRTACEAE

An erect, slender shrub to 1.5 m but more commonly less than 1 m with deep bright pink flowers.

**Flowering Period:** August to November

**Distribution and Habitat**

A widely distributed species known from Collie, Manjimup, Cranbrook, Pingrup, Tambellup and Hassel National Park. It favours sandy soil, sometimes on laterite and is associated with Jarrah/Marri forest over low heaths or, at one location, Mallee (species unknown) heath.

**Conservation Status**

Priority 3

**Known Populations**

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| I Collie   | MON      | COL   | SF          | 15.10.65    | 2000          | -         |

**Response to Disturbance**

**Susceptibility to *Phytophthora* Dieback**

**Management Requirements**

**Research Requirements**

*Chamaescilla gibsonii* Keighery ms

ANTHERICACEAE

Tuberous, rosetted perennial herb to 0.5 m high. Flowers blue.

**Flowering Period:** September to October

**Distribution and Habitat**

Grows on damp sandy clay soils. It occurs from Muchea to Capel on the Swan Coastal Plain and in Jarrah forest.

**Conservation Status**

Priority 3

**Known Populations**

| Population           | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|----------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Capel              | SWC      | CAP   | -           | 24.9.48     | -             | -         |
| 2 Brunswick Junction | MON      | HVY   | -           | 30.9.67     | -             | -         |

**Response to Disturbance**

**Management Requirements**

**Research Requirements**



## *Chordifex gracilior* (Benth.) B.G. Briggs & L.A.S. Johnson

## RESTIONACEAE

### Graceful Cord Rush

*Chordifex gracilior* is a clumped rhizomatous herb to 60 cm x 30 cm wide with slender, erect, green glabrous culms. The sheathing scales are narrow, closely appressed and obtuse. The flowers are shining brown and both male and female inflorescences are erect, sessile and terminal. The male spikelets are rather numerous with shortly exerted anthers. There are 6 narrow perianth-segments, the 2 outer ones concave, the third and the 3 inner ones are flat.

**Flowering Period:** November and January

### Distribution and Habitat

*C. gracilior* occurs between Ruabon and the Scott Plains. The species occurs in heath over sedges or sedgeland on usually flat or depressed winter-wet sites with sand over clay or clay soils.

### Conservation Status

Priority 3

### Known Populations

| Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Yoongarillup     | SWC      | BSN   | -           | 10.10.76    | abundant      | -         |
| 2 Scott River Rd   | SWC      | AMR   | NP          | 7.4.90      | -             | -         |
| 3 Payne Rd         | SWC      | BSN   | Shire       | 15.10.92    | -             | -         |
| 4 Dennis Road      | SWC      | AMR   | SF          | 23.9.90     | common        | -         |
| 5 Brockman Hwy     | SWC      | AMR   | Road        | 10.9.90     | frequent      | -         |
| 6 Scott NP         | SWC      | AMR   | NP          | 24.9.90     | v. common     | -         |
| 7 Scott River Rd N | SWC      | AMR   | Road        | -           | -             | -         |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

### Research Requirements

## *Chorizandra multiarticulata* Nees.

## CYPERACEAE

Bristle Rush

*Chorizandra multiarticulata* is a sedge to 45 cm with a thick creeping rhizome. The many stems are marked with numerous transverse septa, which range from prominent to faint. The leaves are few and are mostly reduced to loose open sheaths. Flowers are borne in numerous spikelets which are globular, sessile and contained in a partially enclosing bract continuous with the stem. Each spikelet consists of a terminal female flower surrounded by several male flowers. The floral glumes are very broad, obtuse to orbicular.

**Flowering Period:** ?August

### **Distribution and Habitat**

Favours damp habitats such as drainage lines. The predominant vegetation in areas where this species has been recorded includes eucalypt woodland and mallee with a heath understorey. It is probable that this rather inconspicuous plant has been overlooked in many surveys and may be less rare than herbarium records suggest.

### **Conservation Status**

Priority 3

### **Known Populations**

| Population       | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Duranillin     | MON      | WEA   | -           | 4.11.88     | loc. common   | -         |
| 2 Scott River    | SWC      | AMR   | -           | 7.11.72     | -             | -         |
| 3 Canebreak      | BWD      | NAN   | SF          | 21.8.62     | -             | -         |
| 4 Black Point Rd | BWD      | NAN   | NP          | 11.74       | -             | -         |

### **Response to Disturbance**

Seems to regenerate from seed after fire, however the optimal period between burns is unknown.

### **Susceptibility to *Phytophthora* Dieback**

Unknown

### **Management Requirements**

Field searches are needed to enable the distribution and conservation status to be assessed more confidently.

### **Research Requirements**

### **References**

- Bentham, G. (1878) *Flora Australiensis: a description of the plants of the Australian Territory*. Vol 7, (Roxburghiaceae to Filices), p345.
- Marchant, N.G., Wheeler, J.R., Rye, B.L., Bennett, E.M., Lander, N.S. and Macfarlane, T.D. (1987) *Flora of the Perth Region* Part 2. Western Australian Herbarium, Department of Agriculture, Western Australia.

## *Chorizema carinatum* (Meisn.) J.M. Taylor & Crisp

## PAPILIONACEAE

*Chorizema carinatum* is an erect or spreading shrub to 60 cm. The branches are slightly striate and glabrous when mature. Leaves are alternate, ovate-elliptic to oblong, 7 - 15 mm long and 2 - 4 mm wide, very shortly petiolate and have a reflexed mucronate tip. The under surface of the leaf is shortly hairy, the upper minutely scabrous to occasionally glabrous. Stipules are minute and shed during maturation. The inflorescence is an erect terminal raceme of 6 - 10 yellow, pilose flowers on pedicels 2 - 4 mm long with 4 - 5 mm bracts and subulate bracteoles; both of which are shed early. The 8 - 10 mm calyx has almost equal lobes covered with loosely appressed golden and long pale hairs. The corolla, which scarcely exceeds the calyx in length has a kidney shaped standard petal, obovate wings and a pouch-like, broadly ovate keel. The style is gently incurved with short hairs on the adaxial edge. The seed pod is ovoid and hirsute with 8 - 10 ovules. It is closely allied to *C. spathulatum*, and less closely to *C. dicksonii*. However it can be distinguished by leaf shape, as *C. spathulatum* has narrowly obovate or spathulate (spoon shaped) leaves, and *C. dicksonii* has narrowly ovate or elliptic leaves and orange-red flowers.

**Flowering Period:** October to November

### Distribution and Habitat

This species is widespread from Cranbrook and Kendenup, through the Stirling and Porongurup Ranges to Cape Riche and Jerramungup. It grows in eucalypt woodland in sand or sandy clay.

### Conservation Status

Priority 3

### Known Populations

|   | Population      | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---|-----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 | Ironstone Gully | BWD      | DBK   | SF          | 11.11.93    | frequent      | -         |
| 2 | Geographe Bay   | SWC      | BSN   | -           | -           | -             | -         |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

### Research Requirements

### References

Taylor, J.M. and Crisp, M.D. (1992) A revision of *Chorizema* (Leguminosae: Mirabellieae). *Australian Systematic Botany* 5, 249-335.

*Chorizema reticulatum* Meisn.

PAPILIONACEAE

**Flowering Period:** Not known as yet

**Distribution and Habitat**

Known from both the Southern Forest and Central Forest Regions, at Albany, Mt Barker, Porongurups, Manypeaks, Denbarker and Denmark. Within the Central Forest Region, it occurs in sandy soils over laterite, within jarrah forest. Other genera recorded from one location include *Allocasuarina*, *Agonis*, *Podocarpus*, *Xanthorrhoea* and *Kingia*.

**Conservation Status**

Priority 3

**Known Populations**

| Population                     | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Mt Yates                     | SWC      | AMR   | -           | 20.9.83     | -             | -         |
| 2 Cowaramup                    | SWC      | AMR   | -           | 9.36        | -             | -         |
| 3 Near Busselton               | SWC      | BSN   | -           | 6.9.39      | -             | -         |
| 4 Rosa Brook                   | SWC      | AMR   | -           | 13.10.48    | -             | -         |
| 5 Between Busselton and Nannup | SWC      | BSN   | -           | 3.9.62      | -             | -         |

**Response to Disturbance**

Unknown - may be information arising from SF populations

**Susceptibility to *Phytophthora* Dieback**

Unknown - may be information arising from SF populations

**Management Requirements**

**Research Requirements**

## *Euchiton collinus* Cass.

## ASTERACEAE

An erect perennial from 5 - 35 cm high. The stem is covered with close silvery woolly hairs. Lower leaves are arranged in a rosette and are obovate and woolly on the lower surface, whilst the upper leaves are narrower and stiff. The yellow flowerheads are densely packed but relatively scarce with a bell shaped involucre of bracts and 2 - 3 floral leaves surrounding each head. Each flower contains 3 - 6 bisexual florets and 44 - 62 female florets.

This species was originally described as *Gnaphalium gymnocephalum* in 1838. It has recently been reclassified as *Euchiton gymnocephalus*.

**Flowering Period:** October to December.

### **Distribution and Habitat**

Soils: sandy soils, gravel, black peaty sand, laterite, granite, and limestone. Habitat: wet habitats, ridges, and slopes.

### **Conservation Status**

Priority 3

### **Known Populations**

| Population   | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Osmington  | SWC      | AMR   | -           | 07.11.46    | -             | -         |
| 2 Nannup     | BWD      | NAN   | -           | 02.09.97    | -             | good      |
| 3 Tallanalla | MON      | HVY   | -           | 30.07.97    | -             | -         |

### **Response to Disturbance**

May be additional information arising from SC or SW populations

### **Susceptibility to *Phytophthora* Dieback**

### **Management Requirements**

### **Research Requirements**

## *Galium migrans* Ehrend & McGill.

## RUBIACEAE

*Galium migrans* is a decumbent species with numerous stems rising to 20 - 40 cm long, multi branched although branching is sometimes reduced or absent in the upper half of the stem. The stems are rarely glabrous. The leaves are elliptical to ovate and sometimes almost linear, 5 - 10 mm long, 1.5 - 3 mm wide and commonly a bright, light green colour. The inflorescences are pyramidal and occupy approximately the upper two thirds of the stems. Peduncles (5 - 15 mm long) are straight while pedicels (2 - 3.5 mm long) are usually slightly curved. Both peduncles and pedicels often persist into the following year. The flowers are cream to yellowish or white and are 1.2 - 2.5 mm in diameter with a circular, flattened corolla.

It is a variable species, but is distinguished from other *Galium* species by the well-developed primary root, much branched habit, the gentle curving of the pedicels and the persistence of both pedicels and peduncles on older stems.

**Flowering Period:** September to December.

### Distribution and Habitat

*G. migrans* is the most widely distributed species of *Galium* in Australia, occurring from south eastern Queensland through New South Wales, Victoria and South Australia to south western Western Australia. Within Western Australia its populations occur from Eucla to Margaret River. Its usual habitat is in moist, open or sheltered places such as rock crevices or over and between stones or boulders near limestone caves.

### Conservation Status

Priority 3

### Known Populations

| Population        | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Turner's Spring | SWC      | AMR   | -           | 28.12.90    | common        | -         |
| 2 Lake Cave       | SWC      | AMR   | -           | 10.05       | -             | -         |
| 3 Mammoth Cave    | SWC      | AMR   | -           | 12.66       | -             | -         |

### Response to Disturbance

### Susceptibility to *Phytophthora* Dieback

### Management Requirements

### Research Requirements

### References

McGillivray, D.J. (1983) A revision of *Galium* (Rubiaceae) in Australia and New Zealand. *Telopea* 2, 355-377.

*Grevillea papillosa* (McGill.) P. Olde & N. Marriott

PROTEACEAE

*Grevillea papillosa* is an erect slender shrub to 3 m. Leaves are simple, to 6 cm long, narrowly elliptic with 2 - 3 short lobes at the apex. They are green-grey, glabrous above, silky hairy below and pungent tipped. The flowers are cream coloured in terminal, axillary, short racemes (which superficially resemble an umbel due to their shortness). The perianth is hairy on the outside and glabrous inside.

Previously referred to as *Grevillea manglesioides* subsp. *papillosa*.

**Flowering Period:** July to December

**Distribution and Habitat**

*Grevillea papillosa* occurs between Black Point and the Blackwood River. Within this area it occurs under or in tall shrubland or heath on sandy soils over ironstone.

**Conservation Status**

Priority 3

**Known Populations**

| Population       | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Long Swamp     | SWC      | AMR   | NP          | 8.4.90      | 10            | -         |
| 2 Scott River Rd | SWC      | AMR   | NP          | 9.4.90      | 10            | -         |
| 3 Gingilup Swamp | BWD      | Nan   | ?           | 19.4.91     | 10            | -         |
| 6 Gingilup Swamp | BWD      | Nan   | ?           | 2.6.95      | 100           | -         |
| 7 Gingilup Swamp | BWD      | Nan   | ?           | 19.4.91     | 10            | -         |
| 8 Scott River Rd | SWC      | AMR   | Shire       | 18.5.92     | 204           | -         |
| 12 Scott Rd      | SWC      | AMR   | NP          | 17.9.90     | -             | -         |
| 13 Chester SF    | SWC      | AMR   | SF          | 13.10.93    | -             | -         |
| 14 Dennis Rd     | SWC      | AMR   | Shire       | 25.2.98     | 20+           | mod       |
| 15 Loc. 4262     | SWC      | AMR   | NR          | 16.12.97    | 100+          | good      |

**Response to Disturbance**

Killed by fire.

**Susceptibility to *Phytophthora* Dieback**

Predicted to be susceptible but as yet not researched.

**Response to Disturbance**

**Management Requirements**

**Research Requirements**

**References**

Keighery, G. and Robinson, C. (1992) A Survey of Declared Rare Flora and Other Plants in Need of Special Protection of the Scott Plains. Unpublished Report to the Australian National Parks and Wildlife Service, Department of Conservation and Land Management, Western Australia.

Olde, P.M. and Marriott, N.R. (1995) *The Grevillea Book* 3: 73-74. Kangaroo Press, Kenthurst N.S.W.

*Grevillea prominens* P. Olde & N. Marriott

PROTEACEAE

Open spreading shrub 50 cm to 1.2 m tall, 30 cm to 1m wide, with angular, smooth branchlets. Leaves are 3 - 4.5 cm long, petiolate, twice divided with leaf lobes usually triangular 4-22 mm long by 0.6 to 2mm wide with a pointed tip. Upper surface smooth grooved along the midvein (no other veins evident) lower surface smooth with midvein and lateral veins evident. Flower buds reddish when very immature, becoming cream. Flowers creamy white, pedicels 1.8 - 3 mm long, pistil smooth and short. Pollen presenter an erect cone with a basal collar.

**Flowering Period:** September

**Distribution and Habitat**

Found only in the Central Forest Region at Harvey, Mt William and Collie. Occurs in gravelly loam soil along creek lines in *Eucalyptus marginata*(Jarrah) forest.

**Conservation Status**

Priority 3

**Known Populations**

| Population   | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Mt William | MON      | HVY   | -           | 5.9.79      | -             | -         |
| 2 Collie     | MON      | COL   | -           | 2.10.68     | -             | -         |

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

**Research Requirements**

**References**

Olde, P.M. and Marriott, N.R. (1995) *The Grevillea Book 3*: 111-112. Kangaroo Press, Kenthurst N.S.W.



## *Hakea oldfieldii* Benth.

## PROTEACEAE

*Hakea oldfieldii* is a tall shrub up to 4m high, young stems striate, red-brown, becoming glabrous. Leaves are linear terete, with a pungent apex. Flower clusters terminating short leafy branchlets or pedunculate in the upper axils. Flowers yellow, receptacle oblique, stigmatic disk erect. Follicle usually 18 - 22 x 8 - 12mm, the surface usually rugose and tuberculate, with a pointed ridge arising near the apex.

**Flowering Period:** July to October

### Distribution and Habitat

Species is found predominantly around the Tutunup-Oates Road areas and along the base of the Whicher scarp. It appears to be associated with areas of deeper red-brown loam over ironstone. Roadside remnant vegetation houses many of the species' populations.

### Conservation Status

Priority 3

### Known Populations

| Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1a Williamson Rd   | SWC      | BSN   | SF          | 29.8.97     | 50+           | moderate  |
| 1b Williamson Rd   | SWC      | BSN   | SF          | 29.8.97     | 50+           | moderate  |
| 2 Smith Rd         | SWC      | BSN   | SF          | 11.6.97     | 100+          | good      |
| 3a Tutunup Rd      | SWC      | BSN   | Shire       | 27.6.97     | 10+           | good      |
| 3b Tutunup Rd      | SWC      | BSN   | Rail        | 27.6.97     | 50+           | good      |
| 4 Oates Rd         | SWC      | BSN   | Shire       | 14.12.94    | 30            | moderate  |
| 5 Ironstone Gully  | SWC      | BSN   | SF          | 20.8.97     | 1000's        | good      |
| 6 Gale/Jindong Rds | SWC      | BSN   | NR          | 20.8.97     | 100+          | good      |
| 7 Loc. 3203        | SWC      | BSN   | PP          | 2.1.98      | 50+           | moderate  |
| 8 Cartis Rd        | SWC      | BSN   | Rail        | 4.12.97     | 37            | good      |
| 9 Princefield Rd   | SWC      | BSN   | Water       | 29.8.97     | 7             | good      |
| 10 Butcher Rd      | SWC      | BSN   | Shire       | 2.1.98      | 6             | poor      |
| 11 Price Rd        | SWC      | BSN   | Shire       | 24.6.97     | 100+          | good      |
| 12 Adams Rd        | SWC      | BSN   | Shire       | 24.6.97     | 50+           | moderate  |
| 13 Harper Rd       | SWC      | BSN   | Shire       | 24.6.97     | 5             | poor      |

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

### Research Requirements

*Hibbertia spicata* F. Muell. subsp. *leptotheca* J.R. Wheeler

DILLENACEAE

A low, sprawling or erect shrub to 0.45 m high with linear leaves (8 - 30 x 1 - 2 mm) which are blunt to sharply pointed with curled edges. The upper leaf surface is glabrous and may be smooth or slightly tuberculate, the lower surface is densely and minutely stellate hairy. The inflorescence is a 2 - 5 flowered spike with small, sessile flowers 5 - 10 mm across. The outer sepals are shorter than the inner row and completely glabrous, whilst the inner sepals are minutely stellate-hairy. There are 10 - 15 stamens arranged on one side of the flower centre.

It is distinguished from *H. spicata* subsp. *spicata* by the shortness of the outer sepals relative to the inner sepals, the absence of hairs on the outer sepals, and the absence of a dark connective body between the anthers. The form of specimens of subsp. *leptotheca* is distinctive. It has a low, almost prostrate form and shiny, short succulent leaves and reflexed sepals.

**Flowering Period:** November to December

**Distribution and Habitat**

Known from Yalgorup to Lancelin, occurring on near-coastal limestone. The population within Yalgorup National Park is located in a low dense shrubland of *Dryandra sessilis* and *Hakea* sp.

**Conservation Status**

Priority 3

**Known Populations**

|   | Population                            | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---|---------------------------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 | Between Lake Clifton and Lake Preston | MON      | HVY   | NP          | 20.10.72    | -             | -         |
| 2 | SCP (YALG03, 04, 08)                  | MON      | WAR   | ?NP         | -           | -             | -         |
| 3 | SCP (WHILL03, 04)                     | MON      | WAR   | -           | -           | -             | -         |
| 4 | SCP (CLIFT02)                         | MON      | WAR   | -           | -           | -             | -         |

**Response to Disturbance**

**Susceptibility to *Phytophthora* Dieback**

**Response to Disturbance**

**Management Requirements**

**Research Requirements**

**References:**

Marchant, N.G., Wheeler, J.R., Rye, B.L., Bennett, E.M., Lander, N.S. and Macfarlane, T.D. (1987) *Flora of the Perth Region* Part 2. Western Australian Herbarium, Department of Agriculture, Western Australia, p131-132.

*Isopogon formosus* R.Br. subsp. *dasylepis* (Meisn.) Foreman

PROTEACEAE

*Isopogon formosus* subsp. *dasylepis* is a shrub up to 1.5 m high. The narrow leaves are up to 5 cm in length with incurved margins such that they sometimes appear terete. They are divided, usually several times with each division two or three branched - the ultimate divisions are usually 1 - 2 mm broad. The flower cones are terminal, ovoid 15 mm in diameter. Cone scales are very densely covered at the base by very curly hairs, ciliate but otherwise glabrous or sparsely hairy above. The calyx is mauve, 20 - 30 cm long, glabrous except for a dense terminal tuft of hairs. Sepal limbs are ca. 1 mm broad. The stigmatic disk (ca. 4 mm long) is distinctly constricted at the middle.

**Flowering Period:** September to October

**Distribution and Habitat**

Known from the Brookton Highway and from nine separate sites in a variety of community types on the Ridge Hill Shelf and Pinjarra Plain near Busselton.

**Conservation Status**

Priority 3

**Known Populations**

| Population      | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------|----------|-------|-------------|-------------|---------------|-----------|
| 2 Williamson Rd | SWC      | BSN   | SF          | 11.6.97     | 100+          | good      |
| 3 Tutanup Rd    | SWC      | BSN   | Road        | 3.8.96      | 50+           | good      |
| 4 Fish Rd       | SWC      | BSN   | Water       | 30.6.97     | 50+           | good      |
| 5 Smith Rd      | SWC      | BSN   | SF          | 11.6.97     | 100+          | good      |
| 6 Ambergate     | SWC      | BSN   | Shire       | 30.6.97     | 100+          | good      |
| 7 Tutanup Rd    | SWC      | BSN   | Rail        | 13.6.97     | 20+           | good      |

**Response to Disturbance**

**Susceptibility to *Phytophthora* Dieback**

**Management Requirements**

**Research Requirements**

## *Jansonia formosa* Lindl.

## FABACEAE

*Jansonia formosa* is a tall open spreading shrub to 3 m x 2 m with young branches silky-pubescent. The leaves are ovate to lanceolate, 10-15 mm long, usually obtuse with a short mucrone and finely reticulate. The upper surface is glabrous and the lower surface is silky-hairy, at least when young. Flower heads (1 or 2) are axillary in upper axils, nearly sessile between the last leaves, recurved and consist of 4 flowers surrounded by several orbicular, brown, pubescent bracts. The flowers are bright red, with a densely haired calyx.

**Flowering Period:** September to November

### Distribution and Habitat

*Jansonia formosa* occurs between Margaret River and Walpole, normally under tall woodland of *Eucalyptus rudis*, *Corymbia calophylla* and *Agonis parviceps* edging creeks or rivers. The species is also more rarely recorded in dense heath. The soils in both these areas are lateritic or ironstone.

### Conservation Status

Priority 3

### Known Populations

| Population                           | District | Shire | Land Status | Last Survey | No. of Plants | Condition  |
|--------------------------------------|----------|-------|-------------|-------------|---------------|------------|
| 1 Scott River                        | SWC      | AMR   | -           | 22.1.64     | -             | -          |
| 2 Brennan's Ford                     | SWC      | AMR   | -           | 16.11.82    | -             | -          |
| 3 Milyeannup                         | BWD      | NAN   | -           | 1.10.76     | -             | -          |
| 4 Augusta                            | SWC      | AMR   | -           | 28.12.22    | -             | -          |
| 5 Darling District                   | SWC      | AMR   | -           | 21.9.83     | common        | -          |
| 6 Margaret River 1                   | SWC      | AMR   | -           | -           | -             | -          |
| 7 Scott River Rd                     | SWC      | AMR   | Shire       | 7.3.95      | -             | ?destroyed |
| 8 Governor Broome Rd 1               | SWC      | AMR   | -           | 24.7.86     | -             | -          |
| 9 Margaret River 2                   | SWC      | AMR   | -           | -           | -             | -          |
| 10 Gingilup Swamp                    | BWD      | NAN   | NR          | 19.04.91    | >200          | healthy    |
| 11 Dennis Rd                         | SWC      | AMR   | -           | -           | -             | -          |
| 12 Don Rd                            | BWD      | NAN   | -           | -           | -             | -          |
| 13 Margaret River 3                  | SWC      | AMR   | Shire       | -           | >100          | good       |
| 14 Gingilup                          | BWD      | NAN   | NR          | -           | >200          | good       |
| 15 Milyeannup                        | BWD      | NAN   | Water       | -           | 20            | good       |
| 16 Chester                           | SWC      | AMR   | SF          | -           | >100          | good       |
| 17 Scott River                       | SWC      | AMR   | Water       | -           | 20            | good       |
| 18 Governor Broome Rd 2              | SWC      | AMR   | Road        | -           | 17            | good       |
| 19 Scott 1                           | SWC      | AMR   | Shire       | -           | >200          | good       |
| 20 Scott 2                           | SWC      | AMR   | NP          | -           | >100          | good       |
| 21 Scott National Park               | SWC      | AMR   | NP          | 26.9.90     | common        | -          |
| 22 Lots 4586 and 4585                | SWC      | NAN   | PP          | 16.6.88     | -             | -          |
| 23 Scott River Plain<br>(gsnr 11,12) | BWD      | NAN   | -           | -           | -             | -          |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

### Response to Disturbance

### Management Requirements

Population 7 was apparently destroyed in 1995 by road grading operations. Survey of this area to check for germination of any seed stock is required.

## Research Requirements

### References:

Keighery, G. and Robinson, C. (1992) A Survey of Declared Rare Flora and Other Plants in Need of Special Protection of the Scott Plains. Unpublished Report to the Australian National Parks and Wildlife Service, Department of Conservation and Land Management, Western Australia.

Bentham, G. (1864) *Flora Australiensis: a description of the plants of the Australian Territory*. Vol 7, (Leguminosae to Combretaceae), p8-9.

*Lambertia multiflora* Lindl. var. *darlingensis* Hnatiuk

PROTEACEAE

*Lambertia multiflora* subsp. *darlingensis* is an erect shrub to 2.5 m. The leaves arise in whorls of three and are sessile around the branch. They are linear to lanceolate and up to 70 mm long with a sharply pointed apex. The floral leaves are sometimes very swollen at the base. The flowerheads are terminal and contain 7 bright yellow flowers. The inner bracts are linear, up to 12 mm long and fringed toward at the apex. The calyx is yellow and 25 - 30 mm long. The stamens are obvious on the split ends of the flowers and the style is exerted with a sparse covering of long spreading hairs except near the apex.

The subspecies *darlingensis* is distinguished by the bright yellow rather than red flowers.

**Flowering Period:** August to October

**Distribution and Habitat**

This species has been recorded from Bindoon to the Whicher Range with at least two sites within conservation reserves. The majority of locations are on sandy soil, often over laterite, but several collections are from areas of granite overlain with either sand or clay. Surrounding vegetation for many locations is eucalypt forest but the species has also been recorded from shrublands and dense low heath. In the Whicher Range it is found within *Eucalyptus marginata/Banksia attenuata* forest.

**Conservation Status**

Priority 3

**Known Populations**

| Population      | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Whicher Range | SWC      | BSN   | -           | 17.10.73    | -             | -         |
| 2 Dardanup      | MON      | DAR   | SF          | 14.10.96    | >100          | good      |

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

**Response to Disturbance**

**Management Requirements**

**Research Requirements**

**References:**

Marchant, N.G., Wheeler, J.R., Rye, B.L., Bennett, E.M., Lander, N.S. and Macfarlane, T.D. (1987) *Flora of the Perth Region* Part 2. Western Australian Herbarium, Department of Agriculture, Western Australia.

## *Lepyrodia heleocharoides* Gilg

## RESTIONACEAE

Originally collected by Pritzel in 1900 from Parkerville on the Darling Range, this species was considered extinct until its rediscovery near Alexandra Bridge. *Lepyrodia heleocharoides* is a slender compact rhizomatous herb to 25 cm x 20 cm. The culms are slender, grey and usually in clumps of 5 - 15. Stems are simple and erect, about 1 mm broad and somewhat compressed. The leaves are closely sheathing, initially terminating to a point, and 10 - 15 mm long. Plants are either male or female and have erect brown or red flowers. Male plants have several flowers at one or two nodes, whereas female plants have only one or two flowers. *Lepyrodia heleocharoides* can be distinguished from other related species by its small stature, slender grey culms and long mucronate sheathing stem scales.

**Flowering Period:** December to January

### Distribution and Habitat

Now only known from several locations within the Central Forest Region, *L. heleocharoides* has been found growing in heath over sedges on winter-wet flats. Soils were peaty sand over clay.

### Conservation Status

Priority 3

### Known Populations

| Population              | District | Shire | Land Status | Last Survey | No. of Plants | Condition   |
|-------------------------|----------|-------|-------------|-------------|---------------|-------------|
| 1 Alexander Bridge      | SWC      | AMR   | -           | 7.10.91     | 14            | undisturbed |
| 2 Yelverton Forest      | SWC      | BSN   | SF          | 18.12.91    | common        | -           |
| 3 E of Alexandra Bridge | SWC      | NAN   | -           | 27.10.88    | -             | -           |
| 4 Chester Block         | SWC      | AMR   | SF          | 28.12.90    | 30            | good        |
| 6 SCP survey (FISH05)   | SWC      | BSN   | -           | -           | -             | -           |
| 7 Dardanup              | MON      | DAR   | SF          | 14.10.96    | 20            | good        |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

### Response to Disturbance

### Management Requirements

### Research Requirements

### References:

Keighery, G. and Robinson, C. (1992) A Survey of Declared Rare Flora and Other Plants in Need of Special Protection of the Scott Plains. Unpublished Report to the Australian National Parks and Wildlife Service, Department of Conservation and Land Management, Western Australia.

Marchant, N.G., Wheeler, J.R., Rye, B.L., Bennett, E.M., Lander, N.S. and Macfarlane, T.D. (1987) *Flora of the Perth Region Part 2*. Western Australian Herbarium, Department of Agriculture, Western Australia.

## *Loxocarya magna* Meney & K.W. Dixon

## RESTIONACEAE

A tufted, robust, rhizomatous herb to 1.5 m and up to 40 cm in diameter. The culms are dense, erect, grey and slightly twisted when in flower (especially in the male plant). Male flowers are dense, erect and brown, whereas female flowers are erect and reddish.

**Flowering Period:** September to November

### Distribution and Habitat

*Loxocarya magna* ms is confined to the Scott Plain where it grows in heath over sedges on red clay-loam over ironstone.

### Conservation Status

Priority 3

### Known Populations

| Population                | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---------------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Dennis Rd               | SWC      | AMR   | -           | 24.9.90     | common        | -         |
| 2 Scott River (srfe03,04) | SWC      | AMR   | NP          | 19.11.91    | -             | -         |
| 3 Ruabon                  | SWC      | BSN   | Rail        | 29.9.90     | common        | -         |
| 4 Governor Broome Rd      | SWC      | AMR   | -           | 11.9.90     | common        | -         |
| 5 Scott NP                | SWC      | AMR   | NP          | 10.9.90     | common        | -         |
| 6 Governor Broome Rd      | SWC      | AMR   | -           | 1.4.90      | >10           | -         |
| 7 Dennis                  | SWC      | AMR   | Road        | -           | 30            | poor      |
| 8 McGregor                | SWC      | AMR   | Road        | -           | 100           | good/poor |
| 9 McGregor                | SWC      | AMR   | PP          | -           | >500          | good      |
| 10 Governor Broome Rd     | SWC      | AMR   | Road        | -           | 50            | good      |
| 11 Scott 1                | SWC      | AMR   | Shire       | -           | >1000         | good      |
| 12 Scott 2                | SWC      | AMR   | Shire       | -           | >500          | good      |
| 13 Scott 3                | SWC      | AMR   | NP          | -           | 20            | good      |
| 14 SCP (SMITH04)          | SWC      | BSN   | -           | -           | -             | -         |
| 15 SCP (WONN03,04)        | SWC      | BSN   | -           | -           | -             | -         |
| 16 SCP (IRGU01,02)        | SWC      | BSN   | -           | -           | -             | -         |
| 17 SCP (WONN06)           | SWC      | BSN   | -           | -           | -             | -         |
| 18 SCP (SMITH01)          | SWC      | BSN   | -           | -           | -             | -         |
| 19 Scott River (srfe01)   | SWC      | AMR   | -           | -           | -             | -         |

### Response to Disturbance

Killed by fire, killed by road grading, response to weed invasion unknown.

### Susceptibility to *Phytophthora* Dieback

Resistant

### Management Requirements

A large population of this species occurs in the recreation reserve adjoining Scott National Park. If this reserve can be added to Scott National Park the species will be securely reserved. If not, this species should be considered for gazettal as rare (G. Keighery).

### Research Requirements

### References:

Keighery, G. and Robinson, C. (1992) A Survey of Declared Rare Flora and Other Plants in Need of Special Protection of the Scott Plains. Unpublished Report to the Australian National Parks and Wildlife Service, Department of Conservation and Land Management, Western Australia.



## *Myriophyllum echinatum* Orchard

## HALORAGACEAE

Originally collected by William Fitzgerald and Cecil Andrews between 1901 and 1905, this species was presumed extinct until rediscovered on a railway verge in 1987.

*Myriophyllum echinatum* is a semi-aquatic annual herb to 3 cm with a prostrate main stem from which the branches and tip ascend. Leaves are alternate and of two types: submerged leaves, approximately 6 mm long by 4 - 5 mm wide, which are trifid with the lamina and lobes distinctly flattened; and emergent leaves, approximately 3 - 4 mm long by 0.5 - 0.6 mm wide, which are linear-lanceolate, flattened and erect. The flowers are unisexual. Female flowers, borne singly in the axils of the emergent leaves, are sessile, with 4 styles and no petals. Male flowers, in a cluster of 2 - 3 and not subtended by leaves, are on a pedicel 0.2 - 0.3 mm long with 4 and 4 stamens. Both male and female flowers are 4-merous and lack sepals. The fruit is approximately cubic and may or may not be sessile. At maturity it separates freely into ovoid mericarps. The fruit is approximately 0.8 mm long x 0.5 mm wide, oblique at the summit, rounded at the base, with dense spreading blunt spines to 0.3 mm long on dorsal surface, especially towards the base.

*M. echinatum* is closely related to *M. limnophilum* and *M. drummondii* but can be distinguished from these species mainly by the presence of the dense blunt spines on the fruit.

**Flowering Period:** October to November

### Distribution and Habitat

At Ruabon and Fish Road this species grows on clay flats under *Melaleuca cuticularis*. On Wonnerup Road it grows under *M. raphiophylla* and *M. uncinata*.

### Conservation Status

Priority 3

### Known Populations

| Population    | District | Shire | Land Status | Last Survey | No. of Plants | Condition   |
|---------------|----------|-------|-------------|-------------|---------------|-------------|
| 1 E of Ruabon | SWC      | BSN   | Rail        | 25.9.92     | v. common     | undisturbed |
| 2 Fish Rd     | SWC      | BSN   | NR          | -           | many 1000's   | -           |
| 3 Ruabon      | SWC      | BSN   | NR          | -           | 100's         | -           |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

### Research Requirements

*Platysace ramosissima* (Benth.) C. Norman

APIACEAE

A slender perennial 30 - 60 cm high with ribbed or angular stems. The leaves are usually shed prior to maturity, but when present are linear, 5 - 20 mm long and acute. Basal leaves, which are much divided, wither early in development. Flowers are present in umbels, which are terminal and occur on long peduncles with 10 - 25 rays. The umbellules are 8 - 15 flowered. The petals are elliptic to obovate and approximately 1.5 mm long. The fruit is laterally compressed and broadly obovate in outline, 2 - 3 x 2.5 - 3 mm.

It is most closely related to *P. xerophila*, from which it can be distinguished by its more erect, less flexuose stems, the larger fruit (2 - 3 mm long compared to 1.5 - 2 mm), and a distribution which extends much further south.

**Flowering Period:** November - February

**Distribution and Habitat**

Occurs from north of Gingin south to Yalgorup. The Gingin to Muchea specimens occur on sand or sandy clay over laterite, whilst the southern specimens from Fremantle and around Yalgorup are associated with limestone.

**Conservation Status**

Priority 3

**Known Populations**

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Yalgorup | MON      | WAR?  | -           | -           | -             | -         |

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

**Research Requirements**

**References;**

Marchant, N.G., Wheeler, J.R., Rye, B.L., Bennett, E.M., Lander, N.S. and Macfarlane, T.D. (1987) *Flora of the Perth Region* Part 2. Western Australian Herbarium, Department of Agriculture, Western Australia.

## *Pultenaea pinifolia* Meisn.

## FABACEAE

*Pultenaea pinifolia* is an erect shrub with loosely pubescent branches. The leaves are narrow-linear with very shortly recurved points and revolute margins, 3 - 4 cm long, glabrous or with a few hairs above and pale or hoary underneath. The flowers are numerous in terminal umbels or heads, sessile within the last leaves, although each flower is distinctly pedicellate. Bracts are overlapping, rather narrow and divided into two parts. Bracteoles are linear, inserted under the calyx and are very deciduous. The calyx is silky-pubescent with broad pointed lobes about twice as long as the tube and the upper two lobes slightly larger and more united. The keel of the pea shaped flower is very incurved. The pod is very hairy, broadly ovate and swollen.

**Flowering Period:** October

### **Distribution and Habitat**

Recorded from D'Entrecasteaux to Busselton, this species is locally common but has a restricted habitat in moist soils adjacent to rivers and tributaries in Marri/Jarra, Bullich or *Banksia littoralis* woodlands over low heaths.

### **Conservation Status**

Priority 3

Known from the Proposed Whicher Range Nature Reserve

### **Known Populations**

| Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Karridale        | SWC      | AMR   | -           | 10.05       | -             | -         |
| 2 Whicher Range    | SWC      | AMR   | NR          | 20.11.85    | abundant      | -         |
| 3 SSE Busselton    | SWC      | BSN   | -           | 24.12.84    | -             | -         |
| 4 Yelverton Forest | SWC      | BSN   | -           | 7.11.89     | common        | -         |
| 5 Cowaramup        | SWC      | AMR   | -           | 10.10.57    | -             | -         |
| 6 Mowen River      | SWC      | AMR   | -           | 11.10.74    | locally comm  | -         |
| 8 Busselton        | SWC      | BSN   | -           | 1870        | -             | -         |
| 9 Rosa Brook       | SWC      | AMR   | -           | 12.10.48    | 25            | -         |
| 10 Yelverton       | SWC      | BSN   | SF          | 10.3.92     | 20-30         | -         |
| 11 Margaret River  | SWC      | AMR   | SF          | 19.8.93     | 1000+         | -         |

### **Susceptibility to *Phytophthora* Dieback**

Unknown

### **Management Requirements**

### **Research Requirements**

*Pultenaea radiata* H.B. Will.

FABACEAE

A small woody shrub 15 - 35 cm tall. The standard petal is yellow and the wings magenta. First collected by Pries in 1870, *Pultenaea radiata* is distinguished from *P. ericifolia* and *P. verruculosa* by very broad bracts and bracteoles, the later completely surrounding the calyx. The upper calyx lobes are connected, with their lobes barely divergent. The ovary of this species is silky, with long hairs reaching almost to the top of the very short style.

Note: A description exists, but is largely in latin. Other than Blackall & Grieve Vol 1, which provides no more detail than above, I am not aware of any more general keys which would cover this species. Will attempt to describe based on herbarium specimens.

**Flowering Period:** September

**Distribution and Habitat**

Known from a number of locations along the Vasse Highway near Busselton, the Whicher Range and Crooked Brook. It occurs within Jarrah or Jarrah/Marri forest over low heaths in lateritic soils.

**Conservation Status**

Priority 3

**Known Populations**

| Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Sabina Rd        | SWC      | BSN   | SF          | 6.10.82     | -             | -         |
| 2 Capel-Dbrook Rd  | BWD      | Kirup | Shire       | 26.9.92     | -             | -         |
| 3 Vasse Hwy        | SWC      | BSN   | MRD         | 13.10.85    | -             | -         |
| 4 Sth Coast Rd     | BWD      | Nan   | SF          | 13.10.93    | -             | -         |
| 5 Butler SF        | BWD      | Nan   | SF          | 25.9.96     | 20000         | -         |
| 6 Gaywal Rd        | SWC      | BSN   | SF          | 19.10.95    | 200           | -         |
| 7 Sabina Rd        | SWC      | BSN   | SF          | 8.10.95     | 1000          | -         |
| 8 Abba SF          | SWC      | BSN   | SF          | 18.10.95    | -             | -         |
| 9 Claymore Rd      | SWC      | BSN   | SF          | 15.10.95    | 100           | -         |
| 10 Haley Rd        | SWC      | BSN   | SF          | 20.10.95    | 100           | -         |
| 11 Haley Rd        | SWC      | BSN   | SF          | 15.10.95    | 1000          | -         |
| 12 Haley Rd        | SWC      | BSN   | SF          | 15.10.95    | -             | -         |
| 13 Lilly Rd        | SWC      | BSN   | SF          | 15.10.95    | -             | -         |
| 14 St. Joseph Rd   | SWC      | BSN   | SF          | 15.10.95    | -             | -         |
| 15 Ironstone Gully | SWC      | BSN   | PP          | 15.10.95    | -             | -         |
| 16 Crooked Brook   | SWC      | BSN   | SF          | 5.10.93     | 300           | -         |

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

**Research Requirements**

**References**

Williamson, H.B. (1921) A revision of the genus *Putenaea*. *Proceedings of the Royal Society of Victoria* 33, 133-148.

## *Rhodanthe pyrethrum* (Steetz) Paul G. Wilson

## ASTERACEAE

*Rhodanthe pyrethrum*, originally named *Helipterum pyrethrum*, is an erect, simple or little-branched annual herb, growing to 20 cm high with basally thickened stems, glabrous throughout. The leaves are narrowly ovate to linear and 3-12 x 0.5-2 mm. Flower heads are solitary, terminal and shortly pedunculate. The involucre is hemispherical and 7-12 mm long, with the bracts have a radiate pure white or tinged pink, ovate, thin lamina, 4-10 mm long. The receptacle is distinctly conic. There are numerous tubular florets, the marginal ones bisexual and the inner ones male. The achenes are compressed ovoid and densely silky-hairy. The pappus consists of 10-15 plumose ciliate bristles.

There is some variability within the species but it is unclear how much is due to growth conditions. Collections made to the north of Perth have the underwater leaves linear acuminate and opposite, whereas collections made to the south have scattered, threadlike underwater leaves. There are also slight differences between populations in the size of achenes, the distribution of globular glands and in the branching of the inflorescence.

*R. pyrethrum* most resembles species in the *Rhodanthe* section. *Achyroclinoides*, particularly in the size and morphology of the achene. However it is distinguished from this section and all other sections of *Rhodanthe* in the nature of the involucre bracts which are all radiant and have claws.

**Flowering Period:** October-November

### Distribution and Habitat

Known from Bullsbrook, Boyanup, Kenwick, Waterloo, Harvey, Capel and Eaton, *R. pyrethrum* highly unusual within its family in its semi-aquatic habitat, commonly occurring in swampy clay or wet mud.

### Conservation Status

Priority 3

### Known Populations

| Population     | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Capel        | SWC      | CAP   | PP          | 23.10.85    | 10            | -         |
| 2 Boyanup      | MON      | CAP   | -           | 30.10.52    | 3             | -         |
| 3 Waterloo     | MON      | DAR   | -           | 10.10.87    | 28            | -         |
| 4 E of Eaton   | MON      | DAR   | Shire       | 2.11.85     | -             | -         |
| 5 Eaton Rd     | MON      | DAR   | -           | 1.12.84     | 12            | -         |
| 6 W of Harvey  | MON      | HVY   | PP          | 2.11.85     | 3             | -         |
| 7 N of Waroona | MON      | WAR   | -           | 23.10.92    | abundant      | -         |
| 8 Eaton Swamp  | MON      | DAR   | Shire       | 1.12.84     | abundant      | -         |
| 9 SCP (WAR003) | MON      | WAR   | -           | -           | -             | -         |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

### Research Requirements

### References

- Marchant, N.G., Wheeler, J.R., Rye, B.L., Bennett, E.M., Lander, N.S. and Macfarlane, T.D. (1987) *Flora of the Perth Region Part 2*. Western Australian Herbarium, Department of Agriculture, Western Australia.
- Wilson, P.G. (1992) The classification of Australian species currently included in *Helipterum* and related genera (Asteraceae: Gnaphalieae): part 1. *Nuytsia* 8, 379-438.

## *Schoenus benthamii* F. Muell.

## CYPERACEAE

Perennial herb, up to 45 cm tall with compressed stems, 1-2 mm wide and distinctly ribbed. The leaves are basal, narrower and usually shorter than the stems. The sheath is open and smooth. The basal involucre bract (leaf like bract at base of floral stalk) is erect, up to 220 mm long and usually to well above the inflorescence. The inflorescence is brown, and may consist of one spikelet or a dense terminal head of up to 10 spikelets. Spikelets are 13-17 mm long, narrow, 3 or 4 flowered. The fruit is 1-1.5 mm long with 3 prominent ridges.

**Flowering Period:** September

### **Distribution and Habitat**

*S. benthamii* is widespread from Mogumber in the mid-west region to Mt Manypeaks in the south coast region. Within the Central Forest region it occurs near Busselton in winter wet flats, in sand over clay within low heath.

### **Conservation Status**

Priority 3

### **Known Populations**

| Population      | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 SSW Busselton | SWC      | BSN   | -           | 13.9.90     | common        | -         |
| 2 Ambergate     | SWC      | BSN   | -           | 19.10.48    | -             | -         |
| 3 Lot 2610      | SWC      | BSN   | -           | -           | -             | -         |
| 4 SCP (MANEA01) | MON      | BUN   | -           | -           | -             | -         |

### **Response to Disturbance**

Unknown

### **Susceptibility to *Phytophthora* dieback**

Unknown

### **Management Requirements**

### **Research Requirements**

### **References**

Marchant, N.G., Wheeler, J.R., Rye, B.L., Bennett, E.M., Lander, N.S. and Macfarlane, T.D. (1987) *Flora of the Perth Region* Part 2. Western Australian Herbarium, Department of Agriculture, Western Australia.

## *Sphenotoma parviflorum* F. Muell.

## EPACRIDACEAE

### Paper Heath

A slender, erect, single stemmed perennial shrub, 15-30 cm tall with clustered, spreading leaves to 50 mm confined to the base of the stem, above which the leaves are shorter and closely appressed. The inflorescence is a dense ovate terminal spike of 5-10 white flowers. The corolla tube (to 5 mm) exceeds the surrounding bracts, and is much longer than the corolla lobes. Other similar *Sphenotoma* species have corolla lobes about equal to the tube.

**Flowering Period:** October-November

### Distribution and Habitat

*S. parviflorum* has been sporadically recorded from east of Esperance to Albany where it grows in winter-wet flats under heath over sedges or sedgeland on sandy clay.

### Conservation Status

Priority 3

### Known Populations

| Population  | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Cowarumup | SWC      | AMR   | -           | 30.10.47    | -             | -         |
| 3 Scott 1   | SWC      | AMR   | NP          | -           | 50            | good      |
| 4 Scott 2   | SWC      | AMR   | NP          | -           | 150           | good      |
| 5 Scott NP  | SWC      | AMR   | NP          | 15.10.90    | -             | -         |

### Response to Disturbance

Unknown; but is probably favoured by fire and soil disturbance in the absence of dieback

### Susceptibility to *Phytophthora* Dieback

Field observation suggests high susceptibility

### Management Requirements

### Research Requirements

Clarify taxonomic status. The exact identity of this species is unclear. Gil Craig recently (Nov. 1993) located the only specimen of this species in Kew with Jocelyn Powell, and they believe that most specimens (in WA Herb.) which are given this name are more likely to be *S. gracile*. The location of the Kew specimen is Thomas River, Cape Le Grande. It is not known whether the Kew specimen is the type or duplicate. Further taxonomic research is required to clarify the identity of *S. parviflorum*.

This species should be searched for between the Scott River Plain and Albany.

### References

Keighery, G. and Robinson, C. (1992) A Survey of Declared Rare Flora and Other Plants in Need of Special Protection of the Scott Plains. Unpublished Report to the Australian National Parks and Wildlife Service, Department of Conservation and Land Management, Western Australia.

## *Stylidium barleei* F. Muell.

## STYLIDIACEAE

### Tooth Leaved Trigger Plant

*S. barleei* is a rosetted perennial herb standing 20 to 30 cm tall with ovate or spatulate leaves, prominently irregularly toothed and glandular-hairy on both sides. The inflorescence is slender, glandular hairy to 30 cm tall, occasionally with two or three small scale-like leaves below the inflorescence. The flowers are borne on a loose elongate raceme and are pale cream to pale to yellow to pinkish mauve in colour.

*S. barleei* is most closely related to *S. spathulatum* but differs in having distinct, irregular toothed leaves.

**Flowering Period:** October to November

### Distribution and Habitat

Occurs in the central forest region from near Busselton to the Nillup Plain, south-west of Nannup. Within this area the species has been recorded in low open woodlands of Jarrah (*Eucalyptus marginata*), Jarrah and *Banksia* and rarely Mountain Marri (*Corymbia haematoxylon*) on white sand or lateritic sand.

### Conservation Status

Priority 3

### Known Populations

| Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Alexander Bridge | BWD      | NAN   | -           | 10.66       | -             | -         |
| 2 Acton Park       | SWC      | BSN   | -           | 13.10.54    | -             | -         |
| 3 Nannup           | BWD      | NAN   | -           | 19.10.74    | -             | -         |
| 4 Brockman Hwy     | BWD      | NAN   | -           | 10.72       | -             | -         |
| 5 Chester Block    | SWC      | AMR   | -           | 31.10.90    | common        | -         |
| 6 Denny Rd         | BWD      | NAN   | -           | 13.11.93    | -             | -         |
| 7 Kemp Rd          | SWC      | BSN   | -           | 4.11.93     | abundant      | -         |
| 8 Swan             | SWC      | BSN   | Shire       | -           | 51            | good      |
| 9 Whicher 1        | SWC      | AMR   | SF          | -           | >100          | good      |
| 10 Whicher 2       | SWC      | AMR   | SF          | -           | >100          | good      |
| 11 Whicher 3       | SWC      | AMR   | SF          | -           | >200          | good      |
| 12 Chester         | SWC      | NAN   | SF          | -           | 53            | good      |
| 13 Milyeaup        | BWD      | NAN   | SF          | -           | >100          | good      |
| 14 Walsall         | SWC      | BSN   | -           | 17.10.49    | -             | -         |
| 15 Lillys Rd       | SWC      | BSN   | -           | -           | -             | -         |

### Response to Disturbance

Killed by fire. Has been found on recently disturbed road bank.

### Susceptibility to *Phytophthora dieback*

Unknown

### Management Requirements

### Research Requirements

Surveys should be undertaken in the forest lands on the Blackwood Plateau to determine if this species is widespread.

### References

Keighery, G. and Robinson, C. (1992) A Survey of Declared Rare Flora and Other Plants in Need of Special Protection of the Scott Plains. Unpublished Report to the Australian National Parks and Wildlife Service, Department of Conservation and Land Management, Western Australia.



## *Stylidium longitubum* Benth.

## STYLIDIACEAE

A small, fleshy stemmed ephemeral herb 5 to 12 cm high with white fibrous roots. The leaves are scarce and alternate and do not occur in a well defined rosette or tuft. The lower leaves are ovate but become progressively more linear higher up the stem. The flowers occur on an irregular corymb 4 to 6 cm high. The calyx is glandular hairy and the corolla is pink with dark red or purple markings and a white centre, 3 - 5 mm long. The lobes are unequal and paired laterally. The labellum is small, triangular and deflexed and the throat contains 4 linear toothed appendages.

It resembles *S. utricularoides* but differs in colour of the corolla lobes, which are pink and white with a yellow throat. It is also similar to the *S. inundatum* complex but has larger flowers.

**Flowering Period:** November

### **Distribution and Habitat**

Known from several localities on the Swan Coastal Plain from Bullsbrook to Bunbury. Also recorded at Busselton and Arthur River. It occurs in seasonal wetland, in sand or sandy clay, from a variety of vegetation types, including Jarrah woodland (Bunbury), *Melaleuca laterita* shrubland (Midland) and cleared land (Upper Swan).

### **Conservation Status**

Priority 3

### **Known Populations**

|   | Population  | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---|-------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 | Yongarillup | SWC      | BSN   | -           | 26.10.47    | -             | -         |
| 2 | Wellington  | MON      | CAP   | -           | 12/1900     | -             | -         |
| 3 | Scott River | BWD      | DBK   | -           | -           | -             | -         |

### **Response to Disturbance**

Has been found growing on cleared land.

### **Susceptibility to *Phytophthora* Dieback**

Unknown

### **Management Requirements**

### **Research Requirements**

### **References**

Marchant, N.G., Wheeler, J.R., Rye, B.L., Bennett, E.M., Lander, N.S. and Macfarlane, T.D. (1987) *Flora of the Perth Region* Part 2. Western Australian Herbarium, Department of Agriculture, Western Australia.

## *Stylidium maritimum* Lowrie, Coates & Kenneally

## STYLIDIACEAE

Perennial herb, forming a leafy tuft of long erect or recurved leaves in groups of mostly 2 arising from each basal papery sheath. Leaves are lanceolate, 20 to 40 cm long, 2 to 5 mm wide, glabrous. Inflorescence is 40 to 55 cm long including scape, peduncles 3 to 6 flowered; lower throat appendages are 3 mm long, white and green with 2 free tips red. Sepals are 3 to 4.5 mm long, 3 free to the base, two joined for two thirds of their length. Corolla is rose pink, lobes vertically paired. Labellum is ovate, mauve and 1.6 mm long by 0.9 mm wide, papillose.

**Flowering Period:** October to November

### Distribution and Habitat

Found on limestone outcrops in crater-like depressions filled with black sandy soil surrounded by low coastal heath and open *Banksia menziesii* woodland, on consolidated white coastal sand dunes. The species occurs in Yalgorup National Park in the Central Forest region. Also occurs north to Breton Bay in the Swan region.

### Conservation Status

Priority 3

### Known Populations

| Population     | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Lake Clifton | X MON    | X WAR | NP          | 20.10.72    | v. common     | -         |
| 2 Lake Clifton | MON      | WAR   | NP          | 20.10.72    | v. common     | -         |
| 3 Site 125     | -        | -     | -           | -           | -             | -         |

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* dieback

Unknown

### Management Requirements

### Research Requirements

### References

Lowrie, A., Coates, D.J. and Kenneally, K.F. (1998) A taxonomic review of the *Stylidium carcifolium* complex (Stylidiaceae), from south-west Western Australia. *Nuytsia* 12, 43-57.

## *Stylidium mimeticum* Lowrie & Carlquist

## STYLIDEACEAE

*Stylidium mimeticum* is an annual herb with glandular hairs scattered primarily over the inflorescence. The leaves are 5 mm long x 2 mm wide, in a basal rosette, smooth, elliptical, flat, and narrowing into a petiole as long as the lamina (leaf blade). The single flower is 5-6 cm tall. The petals, coloured pink at tips, white at bases and marked red in between, are unequal. The posterior 2 are wedge-shaped and 4 mm long, and the anterior 2 are fiddle shaped, 3.5 mm long. The labellum is elliptical, 1.5 mm long x 0.6 mm wide. The column is bent near the middle and has an acuminate appressed appendage, which bends backwards.

*Stylidium mimeticum* is closely related to *S. calcaratum*, *S. ecorne* and *S. edentatum*. It is distinguished from these species by the shape and colour of its corolla, labellum shape and outline and by the column appendage.

**Flowering Period:** December

### Distribution and Habitat

Occurs in the central forest region at Nannup, Scott River, Gingilup and from near Busselton. Habitat preference appears to be winter wet location in red sandy clay with ironstone and clay flats. Associated vegetation was reported as low forest of *Melaleuca raphiophylla* over *Grevillea manglesioides* subsp. *papilosa* heath (Gingilup). *Melaleuca preisianna* woodland over *Calothamnus lateralis* heath (Scott River). A variety of shrublands containing *Melaleuca viminea* (saline shrubland), *Hakea sulcata* and *Verticordia densiflora* (shrubland on dry clay flat) or *Kunzea* aff *micrantha* and *Pericalymna ellipticum* (shrubland on southern ironstone) within the Swan Coastal Plain survey sites.

Also occurs in the Swan Region at Bullsbrook and in the Southern Forest region at Walpole and Cheyne Beach.

### Conservation Status

Priority 3

### Known Populations

| Population       | District | Shire    | Land Status | Last Survey | No. of Plants | Condition |
|------------------|----------|----------|-------------|-------------|---------------|-----------|
| 1 Scott River    | SWC      | AMR      | NP          | 19.11.91    | -             | -         |
| 2 Denny Rd       | BWD      | NAN      | -           | 13.11.93    | -             | -         |
| 3 Gingilup Swamp | BWD      | NAN      | NP          | 19.11.91    | -             | -         |
| 4 Swan C.Plain   | X CF     | N of WAR | -           | -           | -             | -         |
| 5 Swan C.Plain   | X CF     | N of WAR | -           | -           | -             | -         |
| 6 Swan C.Plain   | SWC      | BSN      | -           | -           | -             | -         |
| 7 Swan C.Plain   | SWC      | BSN      | -           | -           | -             | -         |
| 8 Swan C.Plain   | SWC      | BSN      | -           | -           | -             | -         |
| 9 Swan C.Plain   | SWC      | BSN      | -           | -           | -             | -         |
| 10 Swan C.Plain  | X CF     | N of WAR | -           | -           | -             | -         |

### Response to Disturbance

Unknown. More information is possibly available from the SF report.

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

### Research Requirements

### References

Lowrie, A. and Carlquist, S. (1991) Studies in *Stylidium* from Western Australia: New taxa; rediscoveries and range extensions. *Phytologia* 71, 16-18.

## *Synaphea hians* A.S.George

## PROTEACEAE

*Synaphea hians* is a low undershrub with prostrate or decumbent stems to 50 cm long, pubescent and long-pilose, glabrescent. Leaves cuneate, 3-lobed, undulate; petiole 4 – 15 cm long, puberulous and pilose; sheath prominent, red-brown; lamina 4 – 10 cm long, flat, pilose, glabrescent; lobes triangular, entire or shortly 1- or 2-dentate, obtuse to acute, mucronate. Inflorescence a spike 4 – 10 cm long, flowers crowded, peduncle 25 cm long, branched or simple, pilose and puberulous. Perianth yellow, opening widely, puberulous; stigma transversely oblong with erect to incurved horns; ovary pubescent. Fruit broadly obovoid, pilose.

**Flowering Period:** September to October.

### **Distribution and Habitat**

The species is found on sandy soil rises over gravel in low Eucalyptus woodlands.

### **Conservation Status**

Priority 3

### **Known Populations**

| Population          | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|---------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Fish Rd           | SWC      | BSN   | NR          | 22.9.85     | -             | -         |
| 2 Vasse Hwy         | SWC      | BSN   | MRD         | 13.10.85    | -             | -         |
| 3 Collie/Preston Rd | MON      | COL   | Shire       | 25.10.85    | -             | -         |
| 4 Lindberg Rd       | SWC      | BSN   | Shire       | 22.8.97     | 2             | good      |

### **Susceptibility to *Phytophthora* Dieback**

Unknown

### **Management Requirements**

1. Further survey work, field observations indicate species may have a wider distribution than previously thought.

### **Research Requirements**

## *Synaphea whicherensis* A.S.George

## PROTEACEAE

*Synaphea whicherensis* is a clumped small shrub, stems to 60 cm long, sparsely branched, appressed pubescent, soon glabrous. Leaves mostly crowded at annual increment apex, pinnatifid into 3 - 6 arched lobes, flat, petiole 3 - 5 cm long, lamina 3 - 15 cm long; ultimate lobes linear, acute, reticulate, pubescent but soon glabrous except petiole sheath which is velvety adaxially. Inflorescence a spike in upper axils, simple or branched, 2 - 3 cm long; flowers yellow crowded, peduncle to 28 cm long, glabrous, rachis puberulous. Perianth swollen, opening widely, glabrous except a few hairs behind anthers. Stigma ovate, concave, thick; ovary glabrous to pilose. Fruit obovoid to ellipsoidal on short neck.

**Flowering Period:** October to November

### **Distribution and Habitat**

Edge of Whicher Range, on white sand and gravelly soils in *Eucalyptus marginata* / *Banksia attenuata* forest and in shrubland.

### **Conservation Status**

Priority 3

### **Known Populations**

| Population      | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-----------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Vasse Hwy     | SWC      | BSN   | Road        | 25.6.85     | -             | -         |
| 2 Sabina Rd     | SWC      | BSN   | SF          | 15.9.87     | -             | -         |
| 3 Sues Rd       | SWC      | BSN   | SF          | 29.10.89    | -             | -         |
| 4a Goulden Rd   | SWC      | BSN   | SF          | 20.10.93    | -             | -         |
| 4b Kemp Rd      | SWC      | BSN   | SF          | 11.11.93    | -             | -         |
| 5 Goulden Rd    | SWC      | BSN   | SF          | 20.10.93    | -             | -         |
| 6 Williamson Rd | SWC      | BSN   | Shire       | 20.10.93    | -             | -         |
| 7 Claymore Rd   | SWC      | BSN   | SF          | 2.9.94      | -             | -         |
| 8 Sabina Rd     | SWC      | BSN   | SF          | 7.1.97      | -             | -         |
| 9 River Rd      | SWC      | BWD   | SF          | 16.1.97     | -             | -         |

### **Susceptibility to *Phytophthora* Disease**

Unknown

### **Management Requirements**

1. Further surveys to determine range of species.

### **Research Requirements**

*Tetratheca parvifolia* Joy Thomps.

TREMANDRACEAE

A small shrub 20-30 cm tall, the stems branching frequently near or well above a woody rootstock. The stems are slender, terete or somewhat vertically ridged with numerous small wart like protuberances and fine, white curved hairs. Leaves are alternate, infrequently subopposite (nearly opposite) or tending to be in whorls of 3. The leaf blade is usually 3-4 mm long, ovate to elliptical or linear. Flowers occur singly in the axils of upper leaves and the bracts (green) are 0.5-1 mm long. The flower inflorescence stalks are 6-15 mm long, very slender and curved at the top. The calyx (sepals) segments (5) are dark-coloured and deciduous. The petals (5) are dark pink, broadly linguiform (tongue shaped), very narrow at the base and 6-7 mm long. Stamens (usually 10) are 2.5 mm or less in length with very short filaments (<0.25 mm in length), somewhat terete and distinct from the anther which is rather broad based and about 1.25 mm long.

**Flowering Period:** October

**Distribution and Habitat**

Occurs only in the central forest region at CAP and east of Donnybrook.

**Conservation Status**

Priority 3

**Known Populations**

| Population        | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|-------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Upper Capel     | SWC      | CAP   | -           | 28.10.21    | -             | -         |
| 2 Lowden          | -        | -     | -           | 1.14        | -             | -         |
| 3 Donnybrook      | BWD      | DBK   | -           | 10.68       | -             | -         |
| 4 Blackwood River | -        | -     | -           | 1891        | -             | -         |

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora dieback***

Unknown

**Management Requirements**

**Research Requirements**

**References**

Thompson, J. (1976) A revision of the genus *Tetratheca* (Tremandraceae). *Telopea* 1, 139-215.

## *Verticordia attenuata* A.S. George

## MYRTACEAE

Mature plants are up to 1.3 m tall and 0.9 m broad. However younger plants tend to be spindly with an erect habit and about 0.8 m tall. The style appears strap-like when dried.

Distinguished from other species of *Verticordia* by the marked narrowing of the petals towards the few-fimbriate apex and by a dark, thick style (0.3 - 0.4 mm wide near mid-point).

**Flowering Period:** December to April

### **Distribution and Habitat**

Known only from the Central Forest Region at a number of disjunct locations. This species occurs on sandy soils. Recorded from Tuart, Marri and *Banksia littoralis*/*B. ilicifolia* woodlands.

### **Conservation Status**

Priority 3

### **Known Populations**

| Population         | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|--------------------|----------|-------|-------------|-------------|---------------|-----------|
| 1 Eaton            | MON      | DAR   | PP          | 24.8.93     | 19            | -         |
| 2 Ruabon Rd        | SWC      | BSN   | Shire, Rail | 27.6.97     | 1000's        | good      |
| 3 Tutanup Rd       | SWC      | BSN   | Rail        | 8.4.98      | 0.            | good      |
| 4 Res. 22293       | SWC      | BSN   | Rail        | 2.1.96      | 250           | -         |
| 5a Bussell Hwy     | SWC      | CAP   | Road        | 2.1.96      | 200           | good      |
| 5b Coolilup Pltn   | SWC      | CAP   | SF          | 2.1.96      | 800           | good      |
| 6 Plantation Rd    | BWD      | CAP   | Shire       | 2.1.96      | 20            | -         |
| 7 Summerlea Rd     | BWD      | CAP   | Shire       | 2.1.96      | 3             | -         |
| 8 Railway Rd       | BWD      | CAP   | Shire       | 2.1.96      | 50            | -         |
| 9 Levanter Rd/Rail | MON      | DAR   | Rail        | 2.1.96      | 15            | -         |
| 10 Elgin Rd        | BWD      | CAP   | Shire       | 22.12.93    | 70            | -         |
| 11 Tuart Drive     | SWC      | CAP   | Shire       | 27.6.97     | 100+          | moderate  |

### **Response to Disturbance**

Majority of Eaton populations were damaged by a hot bushfire in January 1993.

Most plants at the Picton population were removed due to Westrail construction - translocation of topsoil was attempted. No evidence on file of success of operation.

Evidence that translocation can be successful by an earlier removal of topsoil from Collie mine which germinated.

### **Susceptibility to *Phytophthora* Dieback**

Unknown

### **Management Requirements**

1. Continue liaison with Shires re: road maintenance and fire management.

### **Research Requirements**

### **References**

George, A.S. (1991) New taxa, combinations and typifications in *Verticordia* (Myrtaceae: Chamelaucieae). *Nuytsia* 7, 231-394.

*Xanthoparmelia hypoleia* (Nyl.) Hale

PARMELIACEAE

**Flowering Period:**

**Distribution and Habitat**

On rocks in coastal and temperate hinterland zones. Also occurs in South Africa.

**Conservation Status**

Priority 3

**Known Populations**

| Population | District | Shire | Land Status | Last Survey | No. of Plants | Condition |
|------------|----------|-------|-------------|-------------|---------------|-----------|
|------------|----------|-------|-------------|-------------|---------------|-----------|

**Response to Disturbance**

**Susceptibility to *Phytophthora* dieback**

**Management Requirements**

**Research Requirements**



## PART FOUR: THE PLAN FOR MANAGEMENT

The objective of this Wildlife Management Program is to ensure and enhance, by appropriate management, the continued survival in the wild of populations of Declared Rare Flora and other plants in need of special protection.

### 1. Determining Priorities

Part Two assesses the abundance and conservation status of each Declared Rare Flora taxon within the Central Forest Region and makes recommendations for protection, research and management. On the basis of these recommendations, each taxon was ranked on a scale of 0 to 3 under 18 categories recognised as potential threats or management and research requirements (Table 1). Taxa with no threat or urgency for management and research action were given a score of 0. Those with a high degree of threat or urgency for management and research action were allocated a score of 3. The scores were summed for each of the 43 declared rare taxa and for each threat/requirement category. Table 1 summarises the perceived threats and management and research requirements for each Declared Rare Flora in the Region. A similar process was applied to 31 Priority 1 species found within the region. (Table 2).

Table 3 lists the 43 Declared Rare Flora in priority order according to the urgency of their requirement for protection and management action. Taxa with a high score are the most threatened and/or most in need of action. It is intended that all requirements for each taxon, as outlined in the previous species treatments, will be implemented. Work will be conducted, programmed or deferred according to priority, available funds and existing resources and workloads. Attention is directed to Table 3 to determine which taxa have priority for management actions. This will enable resources and staff within the Central Forest Region to be allocated where most urgently required. Table 4 displays the same process for Priority 1 flora.

For each management action or research requirement, taxa in need of attention can be determined from Table 1.

Ranking the categories illustrates which threats or management requirements are the most critical in the Central Forest Region. The Tables indicate those taxa that are (or may be) threatened by particular activities, as well as identifying which research and management action will be required for the ongoing maintenance of the species.

### 2. Management and Research Actions

Overall ranking of threatened taxa based on the 18 categories of threat, management requirements and research requirements (Table 1) are shown in Table 3. These data suggest that the following taxa warrant immediate management and research action:

*Boronia exilis*  
*Brachysema papilio*  
*Caladenia bryceana* subsp. *bryceana*  
*Caladenia busselliana* ms  
*Caladenia viridescens* ms  
*Darwinia ferricola* ms  
*Darwinia* sp. Williamson [aff. *apiculata*]  
*Drakaea confluens* ms  
*Dryandra nivea* subsp. *uliginosa*  
*Grevillea elongata*  
*Grevillea maccutcheonii*  
*Lambertia echinata* subsp. *occidentalis*  
*Petrophile latericola* ms  
*Rulingia* sp. Trigwell bridge  
*Verticordia plumosa* var. *ananeotes*

*Verticordia plumosa* var. *vassensis*

Specific threats and management or research actions for all Declared Rare Flora in the Central Forest Region are outlined below.

(i) Disease

Little research information is currently available to assess the impact of *Phytophthora* species or other soil-borne pathogens, on Declared Rare Flora in the Central Forest Region. Plants not destroyed by direct infection may be affected indirectly by structural and ecological changes in the affected vegetation. Disturbances such as road construction are known to promote the spread of the disease, particularly in moist, relatively low-lying sites unless performed under strictly controlled hygiene conditions. Urgent research on the impact of dieback on Declared Rare Flora is required and all work of an operational nature near populations of DRF should observe hygiene procedures.

Taxa which may be at risk from *Phytophthora* are:

*Boronia exilis*  
*Brachysema papilio*  
*Caladenia busselliana* ms  
*Chamelaucium roycei* ms  
*Darwinia ferricola* ms  
*Darwinia* sp. Williamson [aff. *apiculata*]  
*Dryandra mimica*  
*Dryandra nivea* subsp. *uliginosa*  
*Dryandra squarrosa* subsp. *argillaceae*  
*Grevillea elongata*  
*Grevillea maccutcheonii*  
*Lambertia echinata* subsp. *occidentalis*  
*Lambertia orbifolia*  
*Petrophile latericola* ms  
*Verticordia plumosa* var. *ananeotes*

(ii) Population Size and Few Populations

A number of Declared Rare Flora are known from few populations or have very small population sizes, making them particularly vulnerable to localised disturbance. The total number of populations for each taxon, including some regard to those occurring outside the region was taken into consideration.

Taxa at risk through low numbers within their population, or which are known from only one population in the Central Forest Region are:

*Brachysema modestum*  
*Brachysema papilio*  
*Caladenia bryceana* subsp. *bryceana*  
*Caladenia dorrienii*  
*Caladenia viridescens* ms  
*Darwinia* sp. Williamson [aff. *apiculata*]  
*Drakaea confluens* ms  
*Dryandra mimica*  
*Eleocharis keigheryi*  
*Eucalyptus phylacis*

*Grevillea maccutcheonii*  
*Grevillea rara*  
*Jacksonia* sp. Collie  
*Lambertia echinata* subsp. *occidentalis*  
*Leptomeria dielsiana*  
*Meziella trifida*  
*Petrophile latericola* ms  
*Rulingia* sp. Trigwell Bridge  
*Wurmbea calcicola*

(iii) Transport Corridors

Populations located near roads, railways and firebreaks are vulnerable to damage or destruction by maintenance operations. Such activities in the vicinity of Rare Flora populations require careful monitoring. Approximately 84 populations, or more than 30 % the total number of populations of Declared Rare Flora in the Central Forest Region occur on, or partly on, road and to a lesser extent, rail reserves. Most of these reserves are narrow and can be affected, both directly and indirectly, by the use and nature of adjoining lands. Threats include weed invasion, periodic grazing, drift of chemical sprays and fertilisers, fence-line maintenance and periodic burning. The vegetation on road reserves can also be affected by rubbish dumping, uncontrolled vehicle access, wildflower picking and camping.

The majority of road reserves are vested in local authorities or the Main Roads Department, and rail reserves in Westrail. Accidental damage can occur during road works such as maintenance operations (grading, weed control), drainage works, road/rail upgrading, metal dumps and sand/gravel extraction.

Other utilities such as power-lines, water pipelines and Telstra lines generally follow road and rail reserves, so that any maintenance, upgrading or management of these utilities close to known populations can also damage plants. This can be in the form of mechanical damage by machinery and equipment, or by chemicals used to control weeds around poles or along pipelines.

Management and field personnel within Shires and the Government departments need to know where the populations of Declared Rare and Priority Flora occur to avoid accidental destruction of plants. This is carried out currently by notification letters from CALM, the use of linear markers in the field and direct liaison CALM district staff and other agencies or their contractors. See (xvii).

The following taxa occurring along transport corridors are most at threat:

*Caladenia busselliana* ms  
*Caladenia viridescens* ms  
*Dryandra nivea* subsp. *uliginosa*  
*Dryandra squarrosa* subsp. *argillaceae*  
*Eleocharis keigheryi*  
*Grevillea maccutcheonii*  
*Verticordia plumosa* var. *ananeotes*  
*Verticordia plumosa* var. *vassensis*

(iv) Short-lived Disturbance Opportunists

Some taxa are favoured by disturbance, either because they cannot compete with associated species in undisturbed vegetation or disturbance is essential for recruitment. Included in this category are taxa favoured both by fire and physical disturbance of the soil, such as occurs when road edges are graded or firebreaks are ploughed. A population which no longer exists as adult plants is considered to be present in the soil as a seed bank, awaiting suitable disturbance to promote seedling growth, unless the population site has become degraded

and is unlikely to support the taxon.

Taxa in this category, which present special management difficulties, are:

*Caladenia viridescens* ms  
*Darwinia ferricola* ms  
*Daviesia elongata* subsp. *elongata*  
*Grevillea maccutcheonii*  
*Verticordia plumosa* var. *ananeotes*

(v) Mining

Mineral sand mining occurs in the South West Capes District particularly in the Capel-Busselton and Scott River areas, in which significant numbers of Declared Rare Flora and Priority taxa are known to occur. Other forms of mining in the region include ilmenite (escarpments in Mornington District), tin (Blackwood District), and gravel/sand mining by local authorities. Gas is extracted from an area within South West Capes District on the edge of the Whicher Scarp. The State's largest coal mining activities occur within the region at Collie. The Coalfields Basin contains several populations of threatened flora.

Mining activities which may affect Declared Rare Flora include exploration (clearing of survey lines and drilling operations), spread of *Phytophthora*, actual mine site establishment, provision of services (road-making, power) and some forms of recreational activity by mine workers. Close liaison between companies, CALM, the Department of Minerals and Energy and the Department of Environmental Protection is essential.

Taxa most at risk from mining are:

*Boronia exilis*  
*Brachysema papilio*  
*Chamelaucium roycei* ms  
*Darwinia ferricola* ms  
*Drakaea elastica*  
*Dryandra nivea* subsp. *uliginosa*  
*Dryandra squarrosa* subsp. *argillaceae*  
*Lambertia orbifolia*  
*Petrophile latericola* ms

(vi) Recreation

A number of taxa in the District are located at sites where they are actually or potentially at risk from recreational activities. These may include camping, bushwalking and off-road vehicle use. Risk may be from trampling, picking or the spread of *Phytophthora* species. Taxa occurring in high profile situations (e.g. along major highways) where they may be subject to picking, are also included in this category. Based on the degree of threat recreation should be controlled or excluded from sensitive population sites. Provision of fencing may be necessary.

The following taxa may be susceptible to damage from recreational activities. Monitoring of recreational use in the vicinity of these species will be required:

*Eucalyptus phylacis*

(vii) Habitat Degradation

There are a number of threats that may cause habitat degradation to populations of Declared Rare Flora both on conservation reserves and other lands. For example, exposure and reduced water availability has been found to be an important factor affecting some taxa, particularly those growing in shallow soils. Other causes of habitat degradation are rises in water tables and salinity, vertebrate (native and feral) and invertebrate grazing or successional changes in the habitat which are unfavourable to the particular species.

Taxa which appear to be at risk due to habitat degradation in these categories are:

*Brachysema modestum*  
*Brachysema papilio*  
*Caladenia bryceana* subsp. *bryceana*  
*Caladenia busselliana* ms  
*Caladenia viridescens* ms  
*Dryandra nivea* subsp. *uliginosa*  
*Eleocharis keigheryi*  
*Grevillea elongata*  
*Grevillea maccutcheonii*  
*Lambertia orbifolia*  
*Verticordia plumosa* var. *ananeotes*  
*Verticordia plumosa* var. *vassensis*

(viii) Environmental Weeds

Control of weeds amongst and near Declared Rare Flora populations is undertaken by District staff. The following taxa most urgently require weed control or eradication in some or all of their populations.

*Caladenia bryceana* R.S.Rogers subsp. *bryceana*  
*Caladenia busselliana* ms  
*Darwinia ferricola* ms  
*Grevillea maccutcheonii*  
*Verticordia plumosa* var. *ananeotes*  
*Verticordia plumosa* var. *vassensis*

(ix) Fire Regimes

All populations of Declared Rare Flora should be excluded from prescribed burns on CALM and other lands until appropriate research has been carried out to determine fire impacts. Species specific fire regimes need to be developed by both research and operational staff. Consideration of other species requirements will be required during this process. These taxa will also need to be protected (by construction of protective breaks or reduction of fuels in surrounding areas) where possible from potential uncontrolled fires unless such fires meet the conditions determined for the particular fire regime developed for that taxon. Those taxa which are obligate seeders should not be burnt on a frequency less than that required for the plants to produce adequate post-fire seed for successful recruitment events and sustainable regeneration of the population. Species that resprout after fire may be reduced in their capacity for regeneration if fires are too frequent.

Taxa considered to be at greatest risk from inappropriate fire regimes or requiring protection/exclusion from fire until specific fire regimes are developed are:

*Boronia exilis*  
*Brachysema papilio*  
*Caladenia busselliana* ms  
*Caladenia viridescens* ms  
*Darwinia ferricola* ms

*Eucalyptus phylacis*  
*Grevillea brachystylis* subsp. *australis*  
*Grevillea elongata*  
*Grevillea maccutcheonii*  
*Lambertia echinata* var. *occidentalis*  
*Rulingia* sp. Trigwell Bridge

(x) Survey

Further survey of suitable habitat for new populations is a requirement for many of the Declared Rare Flora in the Central Forest Region. Some taxa are in need of urgent attention, either because of the small number or size of known populations, or their poor representation in conservation reserves. Some require resurvey where populations have not been field inspected within the last ten years, or where insufficient data are available.

Taxa in most urgent need of further survey are:

*Boronia exilis*  
*Brachysema papilio*  
*Caladenia busselliana* ms  
*Darwinia* sp. Williamson [aff. *apiculata*]  
*Drakaea confluens* ms  
*Eleocharis keigheryi*  
*Grevillea brachystylis* subsp. *australis*  
*Lambertia echinata* subsp. *occidentalis*  
*Laxmannia jamesii*  
*Leptomeria dielsiana*  
*Meziella trifida*  
*Rulingia* sp. Trigwell Bridge  
*Verticordia plumosa* var. *ananeotes*

(xi) Fencing

Declared Rare Flora populations on private property are often on farmland where they require protection from grazing by domestic stock or rabbits. Landholders in the Central Forest Region can and do exclude stock, and on other lands CALM has provided fencing or protection materials.

The following taxa may require protection from grazing, either by fence construction or agreement with landowners to exclude stock from population localities or to protect roadside populations from disturbance:

*Dryandra nivea* subsp. *uliginosa*

Note: during the course on compiling this document many of the highest priority species requiring fences have had fences constructed around them.

(xii) Land Acquisition

Acquisition of land by the Department, either by donation, exchange or purchase, is required for those taxa not well represented on conservation reserves. This enables appropriate management and protection practices to be implemented and the land maintained in a near to natural state. Plants occurring on land reserved for nature conservation are generally considered to be less threatened than those on land designated for other purposes. It should be noted, however, that presence on a reserve contributes to, but does not guarantee, population survival. Reserves are subject to threats such as weed invasion, disease infection, drought, altered drainage and water tables, uncontrolled fires and where approved, mining activities.

Negotiations are currently under way for acquisition of some sites within the Region. Where land is not available for this purpose, other alternatives (e.g. establishment in suitable habitats in reserves) need to be considered.

The following are priority taxa for land acquisition:

*Boronia exilis*  
*Caladenia busselliana* ms  
*Dryandra nivea* subsp. *uliginosa*  
*Dryandra squarrosa* subsp. *argillaceae*  
*Lambertia orbifolia*  
*Rulingia* sp. Trigwell Bridge  
*Verticordia plumosa* var. *ananeotes*

(xiii) Ex situ Germ Plasm Collections

Collection and long term storage of germ plasm (seed or tissues) from wild populations of Declared Rare Flora provides a source of propagation material for future re-establishment, in addition to ensuring protection of populations, or more importantly, taxa, from extinction. Collection should be carried out according to the protocols provided by CALM's Threatened Flora Seed Centre at the Western Australian Herbarium.

Priority for collection of this material will depend upon the degree of threat to the taxon. The majority of species in the Region are not represented in ex situ germ plasm collections.

Those taxa that are represented by few populations and/or low individual numbers are of the highest priority for inclusion in germ plasm collections:

*Boronia exilis*  
*Brachysema modestum*  
*Caladenia bryceana* R.S.Rogers subsp. *bryceana*  
*Caladenia busselliana* ms  
*Caladenia caesarea* subsp. *maritima* ms  
*Caladenia dorrienii*  
*Caladenia excelsa* ms  
*Caladenia viridescens* ms  
*Darwinia ferricola* ms  
*Darwinia* sp. Williamson [aff. *apiculata*]  
*Diuris purdiei*  
*Drakaea confluens* ms  
*Drakaea elastica*  
*Drakaea micrantha* ms  
*Leptomeria dielsiana*

(xiv) Re-introduction

Taxa poorly represented on conservation reserves may need to be considered for re-establishment in suitable, less vulnerable habitats on land designated for nature conservation.

Taxa most urgently requiring re-establishment into the wild by CALM staff under approved Recovery Plans or Interim Recovery Plans as outlined in CALM Policy Statement No. 29 are:

*Brachysema papilio*  
*Caladenia bryceana* subsp. *bryceana*

*Caladenia busselliana* ms  
*Darwinia* sp. Williamson [aff. *apiculata*]  
*Grevillea maccutcheonii*  
*Lambertia echinata* subsp. *occidentalis*  
*Rulingia* sp. Trigwell Bridge  
*Verticordia plumosa* var. *ananeotes*

(xv) Liaison

Many Declared Rare Flora populations occur on or adjacent to land not managed by CALM. This requires close association and cooperation with private landowners, local authorities, land managers and government agencies (e.g. Western Power, Alinta Gas, Westrail and Main Roads W.A.) to ensure their continued survival. Departmental staff are required to provide advice and assistance, regarding conservation and management, to landholders and other agencies with Declared Rare Flora populations on land under their control. Landowners are requested to arrange their operations so that the area will not be destroyed or damaged in any way.

Critical taxa for staff liaison with landowners are:

*Boronia exilis*  
*Caladenia busselliana* ms  
*Caladenia caesarea* subsp. *maritima* ms  
*Caladenia excelsa*  
*Caladenia huegelii*  
*Caladenia viridescens* ms  
*Drakaea confluens* ms  
*Dryandra nivea* subsp. *uliginosa*  
*Dryandra squarrosa* subsp. *argillaceae*  
*Chamelaucium roycei*  
*Eucalyptus phylacis*  
*Grevillea elongata*  
*Grevillea maccutcheonii*  
*Lambertia echinata* subsp. *occidentalis*  
*Lambertia orbifolia*  
*Petrophile latericola* ms  
*Rulingia* sp. Trigwell Bridge  
*Verticordia plumosa* var. *ananeotes*  
*Verticordia plumosa* var. *vassensis*

(xvi) Monitoring

Within the limits of available resources, all populations of Declared Rare Flora in the Central Forest Region should be inspected annually to observe fluctuations in population numbers and to monitor changes in the habitat. Where detrimental changes are seen, this should be followed by appropriate management actions. Species which require most frequent monitoring are those likely to be affected by factors such as weed invasion, accidental damage, drought, fungal disease and those disturbance opportunists which decline rapidly after the initial disturbance event.

A network of permanent monitoring quadrats should be established on approximately 25 threatened flora populations within the Region. Through the detailed mapping of individual plants in small populations, and permanent sample plots for smaller species and larger populations, subsequent surveys can provide information on population dynamics, plant longevity and regeneration. Quadrats will be monitored at a variety of frequencies ranging from annual to 5 yearly.



The following taxa are the highest priority for annual monitoring:

*Boronia exilis*  
*Brachysema modestum*  
*Brachysema papilio*  
*Caladenia bryceana* subsp. *bryceana*  
*Caladenia busselliana* ms  
*Caladenia huegelii*  
*Caladenia caesarea* subsp. *maritima*  
*Caladenia viridescens* ms  
*Darwinia* sp. Williamson [aff. *apiculata*]  
*Drakaea confluens* ms  
*Dryandra squarrosa* subsp. *argillaceae*  
*Eucalyptus phylacis*  
*Grevillea elongata*  
*Grevillea maccutcheonii*  
*Lambertia echinata* subsp. *occidentalis*  
*Meziella trifida*  
*Petrophile latericola* ms  
*Rulingia* sp. Trigwell Bridge  
*Verticordia plumosa* var. *ananeotes*  
*Wurmbea calcicola*

(xvii) Research

Only a few of the Declared Rare Flora within the Central Forest Region have been subject to detailed studies. Research into the taxonomy, genetic systems, population biology and ecology of the other taxa is needed to determine the best means of protecting and managing populations and particularly if re-introduction is considered necessary. Response to fire, drought tolerance, susceptibility to *Phytophthora* species and other introduced pathogens and impact of exotic bees on native pollinators (particularly of members of the Orchidaceae) require special attention.

The following taxa are most urgently in need of research:

*Boronia exilis*  
*Brachysema modestum*  
*Brachysema papilio*  
*Caladenia bryceana* subsp. *bryceana*  
*Caladenia busselliana* ms  
*Caladenia viridescens* ms  
*Darwinia* sp. Williamson [aff. *apiculata*]  
*Drakaea confluens* ms  
*Drakaea elastica*  
*Grevillea brachystylis* subsp. *australis*  
*Grevillea elongata*  
*Grevillea maccutcheonii*  
*Lambertia echinata* subsp. *occidentalis*  
*Rulingia* sp. Trigwell Bridge  
*Verticordia plumosa* var. *ananeotes*  
*Wurmbea calcicola*

(xviii) Linear Marking

Populations in need of linear marking are generally located along linear reserves (road and rail reserves) and firebreaks and are often associated with utilities such as powerlines, water pipelines and Telstra lines. In all these situations they are vulnerable to damage or destruction by maintenance operations. Permanent, but discreet, marker pegs need to be installed at all Declared Rare Flora populations especially along linear routes.

Taxa with populations on CALM and other lands most urgently in need of linear marking or modifications to existing markers are:

*Brachysema modestum*  
*Drakaea confluens* ms  
*Grevillea elongata*  
*Verticordia plumosa* var. *ananeotes*

Other Category – Taxonomic

Although taxonomy has not been selected as a category for ranking of management actions it is appropriate to show the following list of species which require taxonomic work to finalise names:

*Boronia exilis*  
*Caladenia busselliana* ms  
*Caladenia excelsa* ms  
*Caladenia viridescens* ms  
*Darwinia ferricola* ms  
*Darwinia* sp. Williamson  
*Diuris micrantha*  
*Drakaea confluens* ms  
*Drakaea elastica*  
*Drakaea micrantha* ms  
*Petrophile latericola* ms  
*Rulingia* sp. Trigwell Bridge

### 3. Priority Flora in the Central Forest Region

The conservation status of the Priority Flora (poorly known but thought to be rare) in the Central Forest Region is assessed in Part Three. For Priority taxa the most urgent requirement is further survey to enable an accurate assessment of their conservation status. Priority One and Priority Two taxa are frequently in need of survey because of the low numbers of populations and small population sizes.

### 4. Implementation and Term of the Management Program

A recovery team has been appointed which has the task of overseeing and report annually to CALM's Corporate Executive on the implementation of this Management Program.

This Program shall run for a period of 10 years, unless subsequent research or changes to the Schedule of Declared Rare Flora cause it to be superseded earlier. During this period, CALM may institute any changes to the provisions outlined in this Program as are found, through further research or operational management, to be necessary for conservation of the Declared Rare Flora in the Region.

## GLOSSARY

|                   |   |
|-------------------|---|
| <b>abaxial</b>    | the side away from the axis (compare <b>adaxial</b> )   |
| <b>achene</b>     | a small, dry indehiscent fruit with a single locule and a single seed (ovule), and with the seed attached to the ovary wall at a single point   |
| <b>acuminate</b>  | tapering gradually to a protracted point  |
| <b>acute</b>      | terminating in a distinct but not protracted point, the converging edges separated by an angle less than 90 degrees   |
| <b>adaxial</b>    | the side toward the axis (compare <b>abaxial</b> )  |
| <b>adnate</b>     | fusion of unlike parts, as the stamens to the corolla (compare <b>connate</b> )   |
| <b>alternate</b>  | <i>of leaves or other lateral organs</i> , borne singly at different heights on the axis; <i>of floral parts</i> , on a different radius, e.g. describing the position of stamens with respect to petals. cf. <b>opposite</b> |
| <b>annual</b>     | a plant whose life span ends within one year after germination  |
| <b>annular</b>    | in the form of a ring   |
| <b>anther</b>     | the expanded, apical, pollen bearing portion of the stamen  |
| <b>anthesis</b>   | the flowering period, when the flower is fully expanded and functioning   |
| <b>apiculate</b>  | terminating in a short, sharp, flexible point   |
| <b>appendage</b>  | a structure arising from the surface or extending beyond the tip of another structure   |
| <b>appressed</b>  | pressed closely against but not united with   |
| <b>aril</b>       | an appendage growing at or near the hilum of the seed; fleshy thickening of the seed coat   |
| <b>article</b>    | a segment of a jointed stem or of a fruit with constrictions between the seeds  |
| <b>ascending</b>  | growing erect after an oblique or semi-horizontal beginning   |
| <b>attenuate</b>  | tapering gradually  |
| <b>auricle</b>    | a small ear-shaped appendage  |
| <b>awl-shaped</b> | short, narrowly triangular, and sharply pointed like an awl   |
| <b>awn</b>        | a bristle-like appendage, e.g. on the tip or back of the lemma of a grass floret  |

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| <b>axil</b>        | the angle between a leaf or bract and the axis bearing it. adj. <b>axillary</b>   |
| <b>axis</b>        | a stem, (commonly used for the main stem of a whole plant or of an inflorescence)   |
| <b>beak</b>        | a prominent terminal projection, especially of a carpel or fruit  |
| <b>bifurcate</b>   | two-forked; divided into two branches   |
| <b>bract</b>       | a leaf-like structure, different in form from the foliage leaves and without an axillary bud, associated with an inflorescence or flower  |
| <b>bracteole</b>   | a small bract-like structure borne singly or in pairs on the pedicel or calyx of a flower   |
| <b>branchlet</b>   | a small branch  |
| <b>bulb</b>        | an underground bud with thickened fleshy scales, as in the onion  |
| <b>calli</b>       | small outgrowths in the throat of the corolla   |
| <b>callosity</b>   | a hardened or thickened area  |
| <b>calyx</b>       | the sepals of one flower collectively   |
| <b>calyx-tube</b>  | a tube formed by fusion or cohesion of sepals. cf. <b>hypanthium</b>  |
| <b>campanulate</b> | bell-shaped   |
| <b>capitate</b>    | head-like, or in a head-shaped cluster  |
| <b>capitulum</b>   | a racemose inflorescence with sessile flowers compacted on a flattened and expanded, or rounded apex of a peduncle  |
| <b>capsule</b>     | a dry fruit formed from two or more united carpels and dehiscing at maturity to release the seeds   |
| <b>carpel</b>      | a simple pistil formed from one modified leaf, or that part of a compound pistil formed from one modified leaf  |
| <b>cheiridium</b>  | the joined bracts beneath the flower in <i>Calytrix</i> , which form a sleeve-like structure  |
| <b>cilia</b>       | <i>in unicellular plants, gametes, spores etc.</i> , minute hair-like protoplasmic protrusions whose movement confers motility on the cell; <i>in higher plants</i> , hairs more or less confined to the margins of an organ. sing. <b>cilium</b> ; adj. <b>ciliate</b> |
| <b>clavate</b>     | club-shaped   |
| <b>claw</b>        | a narrow, stalk-like basal portion of a petal, sepal or bract   |
| <b>clone</b>       | a group of individuals originating from a single parent plant by vegetative reproduction  |
| <b>column</b>      | a structure extending above the ovary and incorporating stigma, style and stamens   |

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| <b>compressed</b>  | flattened in one plane, either dorsally (bringing the front and back closer together) or laterally (bringing the sides closer together)   |
| <b>cone</b>        | (loosely) <i>in Casuarina</i> , a woody multiple fruit incorporating the bracts and bracteoles associated with the flowers  |
| <b>connate</b>     | fused to another organ (or other organs) of the same kind   |
| <b>connective</b>  | the part of an anther that connects the lobes   |
| <b>conspecific</b> | of the same species   |
| <b>convolute</b>   | <i>of the arrangement of corolla lobes in a bud</i> , a form of imbricate aestivation in which each segment has one edge overlapping the adjacent segment, like a furled umbrella |
| <b>cordate</b>     | <i>of a leaf blade</i> , broad and notched at the base; heart-shaped  |
| <b>corm</b>        | a fleshy, swollen stem base, usually underground, in which food reserves are stored between growing seasons   |
| <b>corolla</b>     | the petals of a flower collectively   |
| <b>corymb</b>      | a racemose inflorescence in which the pedicels of the lower flowers are longer than those of the flowers above, bringing all flowers to about the same level                      |
| <b>crisped</b>     | curled  |
| <b>crown</b>       | the part of a tree or shrub above the level of the lowest branch  |
| <b>cuneate</b>     | wedge-shaped  |
| <b>cuspidate</b>   | tapering into a sharp, rigid point  |
| <b>cyme</b>        | an inflorescence in which each flower, in turn, is formed at the tip of a growing axis and further flowers are formed on branches arising below it                                |
| <b>decumbent</b>   | spreading horizontally but then growing upwards   |
| <b>decurrent</b>   | extending downwards beyond the point of insertion, e.g. of a lamina extending downwards to form a flange along the petiole  |
| <b>decussate</b>   | in pairs, with successive pairs borne at right angles to each other   |
| <b>dehiscent</b>   | breaking open at maturity to release the contents   |
| <b>deltoid</b>     | triangular, with the sides of about equal length  |
| <b>dentate</b>     | toothed   |
| <b>denticulate</b> | finely toothed  |
| <b>dichotomous</b> | forking into two equal branches resulting from the division of the growing point  |

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| <b>disc</b>         | a plate or rim of tissue, derived from the receptacle of a flower, occurring between whorls of floral parts   |
| <b>distal</b>       | remote from the point of origin or attachment. cf. <b>proximal</b>  |
| <b>divaricate</b>   | widely spreading  |
| <b>dorsal</b>       | relating to the back or outward surface of an organ in relation to the axis, as in the lower surface of a leaf  |
| <b>dorsiventral</b> | having structurally different upper and lower surfaces  |
| <b>double-conic</b> | relating to the shape of eucalypt buds, when the hypanthium and operculum are of the same size and cone shape   |
| <b>drupe</b>        | a succulent fruit formed from one carpel, having the seed(s) enclosed in an inner stony layer of the fruit wall. adj. <b>drupaceous</b> (which is often used to mean drupe-like but not strictly a drupe) |
| <b>ellipsoid</b>    | a solid body elliptic in long section and circular in cross section   |
| <b>elliptic</b>     | oval in outline, widest at the centre   |
| <b>endemic</b>      | having a natural distribution confined to a particular geographical region  |
| <b>entire</b>       | having a smooth margin, not dissected or toothed  |
| <b>ephemeral</b>    | short-lived   |
| <b>epidermis</b>    | the outermost cellular layer of a non-woody plant or organ  |
| <b>exserted</b>     | protruding, e.g. of stamens with respect to a corolla tube  |
| <b>falcate</b>      | sickle-shaped   |
| <b>family</b>       | a group of one to many genera believed to be related phylogenetically, usually clearly separable from other such groups   |
| <b>filament</b>     | the stalk of a stamen; a thread one or more cells thick; <i>in blue-green Algae</i> , a trichome enclosed in a mucilaginous sheath. cf. <b>anther</b>   |
| <b>filiform</b>     | thread-like   |
| <b>flexuose</b>     | with curves or bends; sinuous; somewhat zigzagged   |
| <b>floral</b>       | belonging to or associated with a flower  |
| <b>floret</b>       | a grass flower, together with the lemma and palea that enclose it (often applied to flowers in Cyperaceae and Asteraceae)   |
| <b>follicle</b>     | a dry, dehiscent fruit formed from one carpel and dehiscing along the line of fusion of its edges   |
| <b>free</b>         | not fused or united (with other organs)   |
| <b>fruit</b>        | the seed-bearing structure in angiosperms formed from the ovary after flowering   |

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| <b>fusiform</b>    | spindle-shaped, broadest near the middle and tapering toward both ends  |
| <b>genus</b>       | a group of species believed to be related phylogenetically and usually clearly separable from other such groups, or a single species without close relatives. pl. <b>genera</b> |
| <b>glabrescent</b> | becoming glabrous   |
| <b>glabrous</b>    | without hairs   |
| <b>gland</b>       | a structure, without or on the surface of a plant, with a secretory function  |
| <b>glandular</b>   | bearing glands; functioning as a gland  |
| <b>glaucous</b>    | blue-green in colour, with a whitish bloom (as in the juvenile leaves of many eucalypts)  |
| <b>glume</b>       | one of the paired bracts at the base of a grass spikelet; a chaffy bract in the grasses or sedges   |
| <b>habit</b>       | the growth form of a plant, comprising its size, shape, texture and orientation   |
| <b>habitat</b>     | the environment in which a plant lives  |
| <b>halophyte</b>   | a plant adapted to living in highly saline habitats; a plant that accumulates high concentrations of salt in its tissues  |
| <b>hastate</b>     | arrowhead-shaped but with the basal lobes turned outward rather than downward   |
| <b>herb</b>        | any vascular plant that never produces a woody stem. cf. <b>forb</b>  |
| <b>herbaceous</b>  | not woody; soft in texture  |
| <b>hilum</b>       | a scar on the seed indicating its point of attachment   |
| <b>hyaline</b>     | translucent, almost like clear glass  |
| <b>hybrid</b>      | an offspring of genetically different parents (in a Flora, usually applied where the parents are of different species)  |
| <b>hypanthium</b>  | a cup or tube bearing floral parts above the base, and often above the top, of the ovary of a flower  |
| <b>imbricate</b>   | of perianth parts, having the edges overlapping in the bud. Fig. 25   |
| <b>incurved</b>    | bent or curved inwards or upwards; <i>of leaf margins</i> , curved towards the adaxial surface  |
| <b>indumentum</b>  | the epidermal coverings of a plants, collectively.  |
| <b>indusium</b>    | tissue covering the sorus of a fern; the pollen cup of Goodeniaceae.  |
| <b>inferior</b>    | <i>of an ovary</i> , at least partly below the level of attachment of the other flora parts. cf. <b>superior</b>  |

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| <b>inflexed</b>      | bent sharply upwards or forwards   |
| <b>inflorescence</b> | the group or arrangement in which flowers are borne on a plant   |
| <b>internode</b>     | the portion of a stem between the level of insertion of two successive leaves or leaf pairs (or branches of an inflorescence)  |
| <b>involucre</b>     | a whorl of bracts subtending a flower or flower cluster  |
| <b>juvenile</b>      | <i>of leaves</i> , formed on a young plant and different in form from the adult leaves   |
| <b>keel</b>          | a ridge like the keel of a boat; in particular, a boat-shaped structure formed by fusion of the two anterior petals of a flower in Fabaceae  |
| <b>keeled</b>        | <i>of leaves or bracts</i> , folded and ridged along the midrib  |
| <b>labellum</b>      | a lip; in Orchidaceae, the distinctive median petal that serves as an alighting platform for pollinating insects   |
| <b>lamina</b>        | the blade of a leaf  |
| <b>lanceolate</b>    | <i>of a leaf</i> , about four times as long as it is broad, broadest in the lower half and tapering towards the tip  |
| <b>leaflet</b>       | one of the ultimate segments of a compound leaf  |
| <b>legume</b>        | a fruit characteristic of the families Mimosaceae, Caesalpiaceae and Papilionaceae formed from one carpel and either dehiscent along both sides, or indehiscent  |
| <b>lignotuber</b>    | a woody swelling below or just above the ground, containing adventitious buds from which new shoots develop if the top of the plant is cut or burnt (common in the shrubby eucalypts and in many other fire-tolerant Australian shrubs)  |
| <b>ligule</b>        | a tongue-shaped or strap-shaped organ; the flattened part of the ray corolla in the Asteraceae; the membranous appendage arising from the inner surface of the leaf at the junction with the leaf sheath in many grasses and some sedges |
| <b>limb</b>          | the upper free, spreading portion of a corolla or perianth that is connate at the base   |
| <b>linear</b>        | very narrow in relation to the length, and with the sides parallel   |
| <b>lunate</b>        | crescent-shaped  |
| <b>mallee</b>        | a growth habit in which several woody stems arise separately from a lignotuber (usually applied to shrubby eucalypts); a plant having the above growth habit   |
| <b>marginal</b>      | occurring at or very close to the margin   |
| <b>mericarp</b>      | a section of a schizocarp; one of the two halves of the fruit in the Apiaceae  |
| <b>midrib</b>        | the central, and usually the most prominent, vein of a leaf or leaf-like organ   |
| <b>mucro</b>         | a sharp, abrupt terminal point. adj. <b>mucronate</b>  |



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| <b>nerve</b>        | a vein  |
| <b>node</b>         | the level (transverse plane) of a stem at which one or more leaves arise  |
| <b>obconical</b>    | cone-shaped but attached at the narrower end  |
| <b>obcordate</b>    | <i>of a leaf blade</i> , broad and notched at the tip; heart-shaped but attached at the pointed end   |
| <b>oblanceolate</b> | similar in shape to <b>lanceolate</b> but attached at the narrower end  |
| <b>oblique</b>      | <i>of a leaf or leaflet</i> , larger on one side of the midrib than on the other, i.e. asymmetrical. Fig. 23  |
| <b>oblong</b>       | having the length greater than the width but no many times greater, and the sides parallel. Fig. 23   |
| <b>obovate</b>      | similar in shape to <b>ovate</b> but attached at the narrower end. Fig. 23  |
| <b>obtuse</b>       | blunt or rounded at the apex, the converging edges separated by an angle greater than 90 degrees  |
| <b>operculum</b>    | a lid or cover becoming detached at maturity by abscission; <i>in Eucalyptus</i> (for example), a cap covering the bud and formed by fusion or cohesion of perianth parts |
| <b>opposite</b>     | <i>of leaves</i> , borne at the same level but on opposite sides of the stem; <i>of floral parts</i> , on the same radius. cf. <b>alternate</b>                           |
| <b>orbicular</b>    | circular or nearly so   |
| <b>ovate</b>        | shaped like a section through the long axis of an egg, and attached by the wider end. Fig. 23   |
| <b>ovoid</b>        | egg-shaped (in three dimensions)  |
| <b>ovule</b>        | an immature seed  |
| <b>panicle</b>      | a compound raceme; an indeterminate inflorescence in which the flowers are borne on branches of the main axis or on further branches of these                             |
| <b>paniculate</b>   | indeterminate and much branched   |
| <b>papilla</b>      | a small, elongated protuberance on the surface of an organ, usually an extension of one epidermal cell. adj. <b>papillose</b>   |
| <b>pappus</b>       | a tuft (or ring) of hairs or scales borne above the ovary and outside the corolla in Asteraceae and possibly representing the calyx; a tuft of hairs on a fruit           |
| <b>pedicel</b>      | the stalk of a flower. adj. <b>pedicellate</b>  |
| <b>peduncle</b>     | the stalk of an inflorescence; <i>in ferns</i> , the stalk of a sporocarp. adj. <b>pedunculate</b>  |
| <b>peltate</b>      | <i>of a leaf</i> , having the stalk attached to the lower surface of the blade, not the margin (also applied in the same sense to other stalked structures)               |

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| <b>penicillate</b>      | pencil-shaped; tufted like an artist's brush  |
| <b>perennial</b>        | a plant whose life span extends over more than two growing seasons  |
| <b>perianth</b>         | the calyx and corolla of a flower, especially where the two are similar   |
| <b>petal</b>            | a member of the inner whorl of non-fertile parts surrounding the fertile organs of a flower, usually soft and coloured conspicuously        |
| <b>petiole</b>          | the stalk portion of a leaf   |
| <b>phyllode</b>         | a leaf whose blade is much reduced or absent, and whose petiole and rachis have assumed the functions of the whole leaf. cf. <b>cladode</b> |
| <b>phylloclade</b>      | a very leaf-like, photosynthetic stem of a plant whose true leaves are much reduced. cf. <b>cladophyll</b>                                  |
| <b>pinna</b>            | one of the primary divisions or leaflets of a pinnate leaf  |
| <b>pinnule</b>          | a leaflet of a bipinnate leaf   |
| <b>pilose</b>           | hairy, the hairs soft and clearly separated but not sparse  |
| <b>pinnate</b>          | divided into pinnae; once-compound. cf. <b>bipinnate</b>  |
| <b>pinnatifid</b>       | cut deeply into lobes that are spaced out along the axis (of the leaf). cf. <b>palmatifid</b>   |
| <b>pinnatisect</b>      | dissected down to the midrib but having the segments confluent with it  |
| <b>pistil</b>           | a free carpel or a group of fused carpels   |
| <b>placenta</b>         | a region, within an ovary, to which ovules are attached   |
| <b>plumose</b>          | like a feather; with fine hairs branching from a central axis   |
| <b>pod</b>              | a leguminous fruit  |
| <b>pollen presenter</b> | the modified style end in <i>Banksia</i>  |
| <b>pollination</b>      | the transfer of pollen from the male organ, where it is formed, to the receptive region of a female organ, e.g. from anther to stigma       |
| <b>procumbent</b>       | trailing or spreading along the ground but not rooting at the nodes   |
| <b>prostrate</b>        | lying flat on the ground  |
| <b>pruinose</b>         | having a whitish, waxy, powdery bloom on the surface  |
| <b>puberulous</b>       | covered with minute, soft, erect hairs  |
| <b>pubescent</b>        | covered with short, soft, erect hairs   |
| <b>pulvinus</b>         | a swelling at the base of the stalk of a leaf or leaflet, often glandular or responsive to touch  |

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| <b>punctate</b>             | marked with dots   |
| <b>pungent</b>              | ending in a stiff, sharp point; having an acrid taste or smell   |
| <b>raceme</b>               | an indeterminate inflorescence in which a main axis produced a series of flowers on lateral stalks, the oldest at the base and the youngest at the top. adj. <b>racemose</b> |
| <b>rachis</b>               | the axis of an inflorescence or a pinnate leaf; pl. <b>rachises</b> . <b>secondary rachis</b> : the axis of a pinna in a bipinnate leaf                                      |
| <b>receptacle</b>           | the axis of a flower (= <b>torus</b> ); <i>in ferns</i> , an axis on which sporangia arise   |
| <b>recurved</b>             | curved or curled downwards or backwards  |
| <b>reflexed</b>             | bent sharply downwards or backwards  |
| <b>reticulate</b>           | forming a network  |
| <b>retorse</b>              | directed backwards or downwards. cf. <b>antrorse</b>   |
| <b>revolute</b>             | rolled downwards or backwards  |
| <b>rhizome</b>              | a horizontal underground stem  |
| <b>rhomboid</b>             | quadrangular, with the lateral angles obtuse   |
| <b>scabrid (= scabrous)</b> | rough to the touch   |
| <b>scale</b>                | a reduced or rudimentary leaf  |
| <b>scape</b>                | the stem-like, flowering stalk of a plant with radical leaves  |
| <b>scarious</b>             | dry and membranous   |
| <b>sclerophyllous</b>       | with leaves stiffened by sclerenchyma  |
| <b>sepal</b>                | a member of the (usually green) outer whorl of non-fertile parts surrounding the fertile organs of a flower  |
| <b>serrate</b>              | toothed, with asymmetrical teeth pointing forward. Fig. 24   |
| <b>sessile</b>              | without a stalk (when applied to a stigma, indicates that the style is absent, the stigma being 'sessile' on the ovary)  |
| <b>seta</b>                 | a bristle or stiff hair  |
| <b>shrub</b>                | a woody plant less than 5 metres high, either without a distinct main axis, or with branches persisting on the main axis almost to its base                                  |
| <b>simple</b>               | undivided; <i>of a leaf</i> , not divided into leaflets; <i>of a hair or an inflorescence</i> , not branched   |
| <b>sinuate</b>              | with deep, wave-like depressions along the margin. cf. <b>undulate</b>   |
| <b>sinus</b>                | a notch or depression in the margin of an organ  |

|                                 |  |
|---------------------------------|--|
| <b>solitary</b>                 | <i>of flowers</i> , borne singly, not grouped in an inflorescence  |
| <b>spathe</b>                   | a large bract ensheathing an inflorescence   |
| <b>spathulate (= spatulate)</b> | spoon-shaped; broad at the tip and narrowed towards the base   |
| <b>species</b>                  | a taxon comprising individuals, or populations of individuals, capable of interbreeding to produce fertile offspring; the largest group of individuals between which there are no distinguishable, consistent differences in form or reproductive mechanisms |
| <b>spike</b>                    | an unbranched, indeterminate inflorescence in which the flowers are without stalks. adj. <b>spicate</b>  |
| <b>spikelet</b>                 | a unit of the inflorescence in grasses, sedges and some other monocotyledons, consisting of one to many flowers and associated glumes  |
| <b>spine</b>                    | a stiff, sharp-pointed structure, formed by modification of a plant organ, e.g. a lateral branch or a stipule  |
| <b>spindle-shaped</b>           | broadest near the middle and tapering toward both ends   |
| <b>spinescent</b>               | ending in a spine; modified to form a spine  |
| <b>spinose</b>                  | bearing spines   |
| <b>spiral</b>                   | <i>of leaves or floral organs</i> , borne at different levels on the axis, in an ascending spiral. cf. <b>cyclic</b>   |
| <b>stamen</b>                   | the male reproductive organ of a flower, consisting of an anther and a filament  |
| <b>staminode</b>                | a modified stamen which is sterile, producing no pollen, often rudimentary   |
| <b>standard</b>                 | the posterior petal in the flower in Papilionaceae   |
| <b>stellate</b>                 | star-shaped; consisting of star-shaped cells   |
| <b>stem</b>                     | the main axis or a branch of the main axial system of a plant, developed from the plumule of the embryo and typically bearing leaves   |
| <b>stigma</b>                   | the pollen-receptive surface of a carpel or group of fused carpels, usually sticky   |
| <b>stipe</b>                    | a small stalk  |
| <b>stipule</b>                  | one of a pair of appendages at the bases of leaves in many dicotyledons  |
| <b>stolon</b>                   | a prostrate or trailing stem that produces roots at the nodes  |
| <b>striate</b>                  | striped with parallel longitudinal lines or ridges   |
| <b>style</b>                    | the usually narrowed portion of the pistil connecting the stigma to the ovary  |
| <b>subshrub</b>                 | a small shrub  |
| <b>subulate</b>                 | narrow and tapering gradually to a fine point  |

|                    |  |
|--------------------|--|
| <b>subterete</b>   | almost terete  |
| <b>sucker</b>      | a shoot originating from below ground  |
| <b>sulcate</b>     | grooved; furrowed  |
| <b>superior</b>    | attached above, as an ovary that is attached above the point of attachment of the other floral whorls  |
| <b>taxon</b>       | a group or category, at any level, in a system for classifying plants or animals   |
| <b>tepal</b>       | a perianth segment in a flower in which all the perianth segments are similar in appearance  |
| <b>terete</b>      | cylindrical or nearly so; circular in cross-section  |
| <b>terminal</b>    | at the apex or distal end  |
| <b>tessellate</b>  | with a chequered pattern   |
| <b>throat</b>      | of a corolla tube, the top, where the tube joins the lobes   |
| <b>tomentum</b>    | a covering of dense, matted, woolly hairs. adj. <b>tomentose</b>   |
| <b>tortuous</b>    | twisted or bent  |
| <b>torus</b>       | see <b>receptacle</b>  |
| <b>trifoliate</b>  | having three leaves  |
| <b>trigonous</b>   | three-angled   |
| <b>triquetrous</b> | three-edged; with three protruding angles  |
| <b>truncate</b>    | with an abruptly transverse end, as if cut off   |
| <b>tuber</b>       | a storage organ formed by swelling of an underground stem or the distal end of a root  |
| <b>tubercle</b>    | a small wart-like outgrowth  |
| <b>tuberculate</b> | covered with tubercles   |
| <b>tuberous</b>    | swollen; of roots, tuber-like  |
| <b>turgid</b>      | swollen; expanded or inflated  |
| <b>umbel</b>       | a racemose inflorescence in which all the individual flower stalks arise in a cluster at the top of the peduncle and are of about equal length |
| <b>undulate</b>    | wavy, i.e. not flat. cf. <b>sinuate</b>  |
| <b>unisexual</b>   | bearing only male or only female reproductive organs   |
| <b>united</b>      | fused together   |
| <b>urceolate</b>   | urn-shaped   |

|                     |  |
|---------------------|--|
| <b>valve</b>        | one of the segments of a dehiscent fruit, separating from other such segments at maturity  |
| <b>vein</b>         | a strand of vascular tissue  |
| <b>venation</b>     | the arrangement of veins in a leaf   |
| <b>verticillate</b> | arranged in one or more whorls   |
| <b>vesicle</b>      | a bladder-like sac or cavity filled with gas or liquid   |
| <b>vestigial</b>    | reduced from the ancestral condition and no longer functional. cf. <b>rudimentary</b>  |
| <b>villous</b>      | shaggy with long, weak hairs   |
| <b>viscid</b>       | of a surface, sticky; coated with a thick, syrupy secretion  |
| <b>whorl</b>        | a ring of leaves, bracts or floral parts borne at the same level on an axis  |
| <b>wing</b>         | a membranous expansion of a fruit or seed, which aids dispersal; a thin flange of tissue extended beyond the normal outline of a stem or petiole; a lateral petal of a flower in Papilionaceae |

## References

Harris and Harris (1994), McCusker (1981).

## Appendix 1

### CRITERIA FOR RANKING THREATS AND ACTIONS

The ranking system for Declared Rare and Priority One Flora is a Zero to Three (0 – 3) system with 0 denoting nil threat or nil requirement for management action and 3 denoting an immediate and significant threat or an immediate and significant requirement for management action.

Each threat and action category is listed below with a brief explanation of the criteria used to determine the ranking of each species for within the category.

Many species have little known about particular biological characteristics such as susceptibility to *Phytophthora cinnamomi*. Some species, predominantly from the Priority One classification, have dated, and possibly inaccurate locational data. These and other factors have led to the inability to assign a rank to certain categories. These unranked categories appear as a dash, “-“. In determining the overall ranking of each species the number of unknowns, ie: dashes, for each species must be taken into account as a species with little information/data deficiency is likely to rank higher even though the ranking figure may not reflect this.

### THREATS

#### Disease

Plants not destroyed by direct infection may be affected indirectly by structural and ecological changes in the affected vegetation. Disturbances such as road construction are known to promote the spread of fungal diseases, particularly in moist, relatively low-lying sites unless carried out under strictly controlled hygiene conditions. Apart from *Phytophthora* sp, various forms of stem canker and *Armillaria* sp are known to impact on threatened flora in the Central Forest Region.

This category is generalised into:

- a) the degree of the threat to disease invasion to which the taxon may be subjected
- b) the degree of susceptibility of the individual taxon.

|              |  |
|--------------|--|
| 0 represents | nil susceptibility                               |
| 1 represents | low susceptibility and low threat                |
| 2 represents | moderate susceptibility with threat              |
| 3 represents | high susceptibility with moderate or high threat |

#### Small/few populations

A number of Declared Rare Flora are known from few populations or have very small population sizes, making them particularly vulnerable to localised disturbance.

The criteria set out below was deviated from for some taxa when other threats to the populations provided reasonable justification to do so.

|              |   |
|--------------|---|
| 0 represents | >10 pop's + moderate to large numbers within 50% of pop's   |
| 1 represents | >10 pop's + low to moderate numbers or,<br>5 – 10 pop's with moderate to high numbers within 50% of pop's                       |
| 2 represents | <10 pop's with low to moderate numbers in less than 25% of pop's or,<br><5 pop's with moderate to high numbers in >50% of pop's |
| 3 represents | <5 pop's with low numbers in <50% of pop's  |

## Transport corridors

Flora populations located near roads, railways, maintenance access tracks and firebreaks are vulnerable to damage or destruction by many vectors including maintenance operations, weed invasion, uncontrolled vehicle access and unsympathetic periodic burning regimes.

|              |   |
|--------------|---|
| 0 represents | Pop's not located within a transport corridor                         |
| 1 represents | < 50% of pop's on transport corridors but not likely to impacted upon |
| 2 represents | > 50% of pop's on transport corridors but moderately protected        |
| 3 represents | > 50% pop's on transport corridors and likely to be impacted upon     |

## Disturbance opportunists

This category has two aspects:

- The threat of disturbance to a particular taxa
- The degree to which the particular taxa can respond to disturbance.

There are number of taxa for which little is known about their response to disturbance. These species have been ranked appropriately with an unknown ie: a dash "-".

|              |   |
|--------------|---|
| 0 represents | Nil threat of disturbance   |
| 1 represents | A low threat of disturbance or<br>A moderate threat of disturbance with a favourable response     |
| 2 represents | A moderate threat of disturbance with a low response or<br>A high threat with a moderate response |
| 3 represents | A high threat with a low response   |

## Mining

Mineral sand, gas, coal, ilmenite, tin and gravel/sand mining all occur within the CFR. Mining activities which may affect Declared Rare Flora include exploration (clearing of survey lines and drilling operations), spread of *Phytophthora*, actual mine site establishment, provision of services (road-making, power) and increased recreation activity by mine workers.

|              |   |
|--------------|---|
| 0 represents | Nil threat  |
| 1 represents | Minimal threat with some associated protection      |
| 2 represents | Moderate threat with little associated protection   |
| 3 represents | High threat with little or no associated protection |

## Recreation

A number of taxa in the District are located at sites where they are actually or potentially at risk from recreational activities. These may include camping, bushwalking, firewood collection and off-road vehicle use.

|              |   |
|--------------|---|
| 0 represents | Nil threat  |
| 1 represents | Minimal threat with some associated protection      |
| 2 represents | Moderate threat with little associated protection   |
| 3 represents | High threat with little or no associated protection |

## Habitat degradation

There are a number of threats that may cause habitat degradation to populations of threatened flora both on conservation reserves and on other lands. For example, exposure and reduced water availability has been found



to be an important factor affecting some taxa, particularly those growing in shallow soils. Other causes of habitat degradation are rises in water tables and salinity.

- 0 represents Nil threat
- 1 represents Minimal threat with some associated protection
- 2 represents Moderate threat with little associated protection
- 3 represents High threat with little or no associated protection

### **Environmental weeds**

Ranking weeds is done by determining the effect of weed invasion on the particular taxon and also categorising the risk of invasion and the biological attributes of particular types of weed species.

- 0 represents Nil threat of invasion or  
Minimal threat of invasion and moderate resistance to invasion
- 1 represents Minimal threat of invasion or  
Moderate threat of invasion and moderate resistance to invasion
- 2 represents Moderate threat of invasion and minimal resistance to invasion or  
High threat of invasion and moderate resistance to invasion
- 3 represents High threat of invasion with minimal resistance to invasion

### **Inappropriate fire regime**

There are several factors taken into account in ranking this category. They include:

- a) Regeneration techniques of the taxa
- b) Response to frequent fire
- c) The requirement for protection/exclusion from fire until specific fire regimes are developed

This category also has many taxa for which the responses are unknown.

- 0 represents Nil threat and excellent response
- 1 represents Minimal threat and moderate response
- 2 represents Moderate threat with moderate response
- 3 represents High threat with low response

## MANAGEMENT AND RESEARCH ACTION REQUIREMENTS

### Survey populations

There are a number of factors that required consideration in determining the ranking for this category including:

- a) The number or size of known populations
- b) The poor representation in conservation reserves
- c) The date of last inspection

|              |   |
|--------------|---|
| 0 represents | Sufficient pop's and data                                     |
| 1 represents | Sufficient pop's and some questionable data                   |
| 2 represents | Moderately sufficient pop's and moderately questionable data  |
| 3 represents | Insufficient pop's and moderately or highly questionable data |

### Land acquisitions

The ranking for this category is generally achieved by considering whether or not a taxon is well represented on conservation reserves. However, presence on a reserve contributes to, but does not guarantee, population survival thus other threatening process factors such as weed invasion, disease infection, drought, altered drainage and water tables, uncontrolled fires and where approved, mining activities also need to be taken into account.

|              |  |
|--------------|--|
| 0 represents | Well represented on reserves and secure  |
| 1 represents | Well represented on reserves and moderately secure or<br>Moderately represented on reserves and secure   |
| 2 represents | Well represented on reserves and not secure or<br>Moderately represented on reserves and moderately secure or<br>Poorly represented on reserves and secure |
| 3 represents | Poorly represented on reserves and not secure or<br>Not represented on reserves and not secure   |

### Fencing

This category considers populations of flora on farmland where they require protection from grazing by domestic stock. Rabbits and native grazing species are also a widespread problem, particularly on sandy soils and thus some populations on crown lands may also require fencing.

|              |                                   |
|--------------|-----------------------------------|
| 0 represents | Nil requirement for fencing       |
| 1 represents | Minimal requirement for fencing   |
| 2 represents | Moderate requirement for fencing  |
| 3 represents | Immediate requirement for fencing |

### Germplasm collection

Collection and long term storage of germplasm (seed or tissues) from wild populations of threatened flora provides a source of propagation material for future re-establishment, in addition to ensuring protection of populations, or in extreme cases, taxa, from extinction.

The ranking of this category considers the priority for collection of germplasm depending upon the degree of threat to the taxon and the amount and condition of germplasm material currently in storage.

|              |                      |
|--------------|----------------------|
| 0 represents | Nil requirement      |
| 1 represents | Minimal requirement  |
| 2 represents | Moderate requirement |

3 represents Immediate requirement

### **Re-establishment**

Taxa poorly represented on conservation reserves may need to be considered for re-establishment in suitable, less vulnerable habitats on land designated for nature conservation. This category considers the requirement for re-establishment based on a number of factors including:

- a) Status of current populations
- b) Threat to current populations
- c) Propagation and cultivation suitability

0 represents Nil requirement  
1 represents Minimal requirement  
2 represents Moderate requirement  
3 represents Immediate requirement

### **Liaison**

Many threatened flora populations occur on or adjacent to land not managed by CALM. This requires close association and cooperation with private landowners, local authorities, land managers and government agencies (e.g. Western Power, Alinta Gas, Westrail and Main Roads W.A.) to ensure their continued survival.

This category was ranked by considering the following issues:

- a) Proportion of populations on CALM managed land versus non CALM managed land
- b) Threats associated with populations on all lands

0 represents Nil requirement for liaison  
1 represents Minimal requirement for liaison  
2 represents Moderate requirements for liaison  
3 represents Immediate requirement for liaison

### **Monitoring**

Species which require most frequent monitoring are those likely to be affected by factors such as weed invasion, accidental damage, drought, fungal disease and those disturbance opportunists which decline rapidly after the initial disturbance event.

Also considered in this category of ranking is the size and number of populations as it relates to the above threats.

0 represents Minimal requirement for monitoring – every five years  
1 represents Moderate requirement for monitoring – every two years  
2 represents High requirement for monitoring - annually  
3 represents Immediate requirement for monitoring – immediate and greater than annually

### **Research**

The ranking of this category considered the requirement for research into the taxonomy, genetic systems, population biology and ecology of each taxon needed to determine the best means of protecting and managing populations particularly if re-introduction is considered necessary. Of course this ranking also considers the overall status of each taxon to determine its priority within the region.

0 represents Nil requirement for research

- 1 represents Minimal requirement for research
- 2 represents Moderate requirement for research
- 3 represents Immediate requirement for research

**Linear marking**

Ranking the requirement for linear marking is determined by the following:

- a) The priority of populations vulnerable to damage or destruction by maintenance operations
- b) The type of vehicular access utilising the route ie: recreational use or road maintenance
- c) The requirement for upkeep of installed markers

- 0 represents Nil requirement for linear marking
- 1 represents Minimal requirement for linear marking
- 2 represents Moderate requirement for linear marking
- 3 represents Immediate requirement for linear marking

**Table 1: CFR Declared Rare Flora Scored (0 - 3) according to degree of threat and urgency for management and/or research action**

|  | Disease | Small/few populations | Transport corridors | Disturbance opportunists | Mining | Recreation | Habitat degradation | Environmental weeds | Inappropriate fire regime | Total of Threats | Rank of Threat | Survey populations | Fencing | Land acquisitions | Germ plasm collection | Re-establishment | Liaison | Monitoring | Research | Linear marking | Total of Actions | Rank of Action | Overall Total | Overall Ranking |
|--|---------|-----------------------|---------------------|--------------------------|--------|------------|---------------------|---------------------|---------------------------|------------------|----------------|--------------------|---------|-------------------|-----------------------|------------------|---------|------------|----------|----------------|------------------|----------------|---------------|-----------------|
| <i>Boronia exilis</i>  | 0       | 2                     | 2                   | 2                        | 3      | 1          | -                   | -                   | 3                         | 13               | 11             | 3                  | 2       | 3                 | 3                     | -                | 3       | 3          | 3        | 2              | 22               | 2              | 35            | 3               |
| <i>Brachysema modestum</i>   | 0       | 3                     | 0                   | -                        | -      | 1          | 3                   | 1                   | 1                         | 9                | 10             | 1                  | 0       | 0                 | 3                     | 2                | 0       | 3          | 3        | 3              | 15               | 7              | 24            | 13              |
| <i>Brachysema papilio</i>  | 3       | 3                     | 0                   | -                        | 2      | 1          | 3                   | 2                   | 3                         | 17               | 5              | 2                  | 0       | 0                 | 1                     | 3                | 1       | 3          | 3        | 0              | 13               | 9              | 30            | 7               |
| <i>Caladenia bryceana</i><br>R.S.Rogers subsp.<br><i>bryceana</i> ms | 0       | 3                     | 0                   | -                        | 0      | 0          | 3                   | 3                   | -                         | 9                | 10             | 2                  | 0       | 0                 | 3                     | 2                | 2       | 3          | 3        | 0              | 15               | 7              | 24            | 13              |
| <i>Caladenia busselliana</i><br>ms                                   | 0       | 3                     | 3                   | -                        | -      | 2          | 2                   | 3                   | 3                         | 16               | 2              | 2                  | 0       | 3                 | 3                     | 3                | 2       | 3          | 3        | 1              | 20               | 3              | 36            | 2               |
| <i>Caladenia caesarea</i><br>subsp. <i>maritima</i> ms               | 0       | 2                     | 1                   | -                        | 0      | 2          | 1                   | 2                   | 2                         | 10               | 9              | 1                  | 0       | 2                 | 3                     | 1                | 3       | 2          | 2        | 1              | 15               | 7              | 25            | 12              |
| <i>Caladenia dorrilenii</i>  | 0       | 3                     | 0                   | 1                        | 0      | 2          | 1                   | 2                   | 2                         | 11               | 8              | 1                  | 0       | 0                 | 3                     | 1                | 2       | 2          | 2        | 0              | 11               | 11             | 22            | 15              |
| <i>Caladenia excelsa</i> ms  | 0       | 2                     | 2                   | -                        | 0      | 2          | 1                   | 2                   | 2                         | 11               | 8              | 2                  | 1       | 1                 | 3                     | 1                | 2       | 1          | 2        | 2              | 15               | 7              | 26            | 11              |
| <i>Caladenia harringtoniae</i> ms                                    | 0       | 2                     | 1                   | -                        | 0      | 1          | 1                   | 1                   | 1                         | 7                | 12             | 1                  | 0       | 0                 | 2                     | 0                | 2       | 1          | 1        | 1              | 8                | 14             | 15            | 22              |
| <i>Caladenia huegellii</i>   | 0       | 1                     | 1                   | 1                        | 0      | 1          | 1                   | 1                   | 2                         | 8                | 11             | 2                  | 0       | 0                 | 2                     | 0                | 2       | 2          | 1        | 2              | 11               | 11             | 19            | 18              |

**Table 1: CFR Declared Rare Flora Scored (0 - 3) according to degree of threat and urgency for management and/or research action. Page 2.**

|  | Disease | Small/few populations | Transport corridors | Disturbance opportunists | Mining | Recreation | Habitat degradation | Environmental weeds | Inappropriate fire regime | Total of Threats | Rank of Threat | Survey populations | Fencing | Land acquisitions | Germ plasm collection | Re-establishment | Liaison | Monitoring | Research | Linear marking | Total of Actions | Rank of Action | Overall Total | Overall Ranking |
|--|---------|-----------------------|---------------------|--------------------------|--------|------------|---------------------|---------------------|---------------------------|------------------|----------------|--------------------|---------|-------------------|-----------------------|------------------|---------|------------|----------|----------------|------------------|----------------|---------------|-----------------|
| <i>Caladenia viridescens</i> ms                                      | 0       | 3                     | 3                   | 2                        | 0      | 2          | 3                   | 2                   | 3                         | 18               | 2              | 1                  | 1       | 1                 | 3                     | -                | 3       | 3          | 3        | 1              | 16               | 6              | 34            | 4               |
| <i>Chamaelaucium royciei</i> ms                                      | 2       | 1                     | 2                   | 2                        | 2      | 2          | 1                   | 2                   | 2                         | 16               | 4              | 1                  | 1       | 2                 | 2                     | 0                | 2       | 1          | 1        | 1              | 10               | 12             | 26            | 11              |
| <i>Darwinia ferricola</i> ms   | 3       | 0                     | 1                   | 3                        | 1      | 0          | 2                   | 3                   | 3                         | 16               | 4              | 1                  | 2       | 2                 | 3                     | 0                | 2       | 1          | 1        | 2              | 14               | 8              | 30            | 7               |
| <i>Darwinia</i> sp.<br><i>Williamson</i> [aff.<br><i>apiculata</i> ] | 3       | 3                     | 1                   | -                        | 0      | 2          | 1                   | 1                   | 2                         | 13               | 8              | 3                  | 0       | 0                 | 3                     | 3                | 1       | 3          | 3        | 1              | 17               | 5              | 30            | 7               |
| <i>Daviesia elongata</i><br>subsp. <i>elongata</i>                   | 2       | 0                     | 1                   | 3                        | 0      | 1          | -                   | -                   | -                         | 7                | 12             | 1                  | 0       | 0                 | 1                     | -                | 1       | 2          | 2        | -              | 7                | 15             | 14            | 23              |
| <i>Diuris micrantha</i>  | -       | 2                     | 1                   | -                        | 0      | 1          | 1                   | 0                   | -                         | 5                | 14             | 1                  | 0       | 0                 | 1                     | 1                | 1       | 1          | 2        | 0              | 7                | 15             | 12            | 25              |
| <i>Diuris purdiei</i>  | -       | 2                     | 0                   | 2                        | 1      | 1          | 1                   | -                   | 2                         | 9                | 10             | 2                  | 1       | 1                 | 3                     | 1                | 2       | 2          | 2        | 1              | 15               | 7              | 24            | 13              |
| <i>Drakeaea confluens</i> ms   | -       | 3                     | 0                   | 1                        | 0      | 2          | -                   | -                   | -                         | 6                | 13             | 3                  | 2       | 2                 | 3                     | 1                | 3       | 2          | 3        | 3              | 22               | 2              | 28            | 9               |
| <i>Drakeaea elastica</i>   | -       | 2                     | 1                   | -                        | 1      | 1          | 1                   | -                   | -                         | 6                | 13             | 1                  | 0       | 0                 | 3                     | -                | 1       | 2          | 3        | 2              | 12               | 10             | 18            | 19              |
| <i>Drakeaea micrantha</i> ms   | 2       | 1                     | 0                   | -                        | 0      | 1          | 2                   | -                   | -                         | 6                | 13             | 1                  | 0       | 0                 | 3                     | 1                | 2       | 1          | 2        | 1              | 11               | 11             | 17            | 20              |

Table 1: CFR Declared Rare Flora Scored (0 - 3) according to degree of threat and urgency for management and/or research action. Page 3.

|   | Disease | Small/few populations | Transport corridors | Disturbance opportunists | Mining | Recreation | Habitat degradation | Environmental weeds | Inappropriate fire regime | Total of Threats | Rank of Threat | Survey populations | Fencing | Land acquisitions | Germ plasm collection | Re-establishment | Liaison | Monitoring | Research | Linear marking | Total of Actions | Rank of Action | Overall Total | Overall Ranking |
|---|---------|-----------------------|---------------------|--------------------------|--------|------------|---------------------|---------------------|---------------------------|------------------|----------------|--------------------|---------|-------------------|-----------------------|------------------|---------|------------|----------|----------------|------------------|----------------|---------------|-----------------|
| <i>Dryandra mimica</i>                                | 2       | 3                     | 0                   | 1                        | 0      | 1          | 1                   | -                   | 2                         | 10               | 9              | 1                  | 0       | 0                 | 0                     | 1                | 1       | 2          | 2        | 1              | 8                | 14             | 18            | 19              |
| <i>Dryandra nivea</i> subsp. <i>uliginosa</i>         | 3       | 2                     | 3                   | -                        | 1      | 1          | 2                   | 2                   | 1                         | 15               | 2              | 2                  | 2       | 2                 | 0                     | 1                | 2       | 2          | 2        | 1              | 14               | 8              | 29            | 8               |
| <i>Dryandra squarrosa</i> subsp. <i>argillacea</i>    | 3       | 2                     | 2                   | 1                        | 1      | 2          | 1                   | 2                   | 2                         | 16               | 4              | 2                  | -       | 2                 | 0                     | 0                | 2       | 2          | 1        | 1              | 10               | 12             | 26            | 11              |
| <i>Eleocharis keigheryi</i>                           | -       | 3                     | 3                   | 1                        | 0      | 0          | 3                   | 2                   | 1                         | 13               | 6              | 3                  | 0       | 1                 | 1                     | -                | 2       | 2          | 0        | 1              | 10               | 12             | 23            | 14              |
| <i>Eucalyptus phyllacis</i>                           | 2       | 3                     | 1                   | 1                        | 0      | 3          | 1                   | 1                   | 3                         | 15               | 6              | 1                  | 1       | 0                 | -                     | 0                | 3       | 2          | 2        | 1              | 10               | 13             | 25            | 12              |
| <i>Grevillea brachystylis</i> subsp. <i>australis</i> | 2       | 2                     | 1                   | 2                        | 0      | 0          | 0                   | 0                   | 3                         | 10               | 9              | 3                  | 0       | 0                 | 1                     | -                | 1       | 2          | 3        | 1              | 11               | 13             | 21            | 16              |
| <i>Grevillea elongata</i>                             | 2       | 1                     | 2                   | -                        | 0      | 2          | 3                   | -                   | 3                         | 13               | 11             | 1                  | 2       | 0                 | 1                     | 1                | 3       | 2          | 3        | 3              | 16               | 7              | 29            | 8               |
| <i>Grevillea maccutcheonii</i>                        | 2       | 3                     | 3                   | 2                        | 0      | 1          | 3                   | 3                   | 3                         | 20               | 5              | 0                  | 1       | 1                 | 2                     | 3                | 2       | 3          | 3        | 0              | 15               | 8              | 35            | 3               |
| <i>Grevillea rara</i>                                 | -       | 3                     | 0                   | 1                        | 0      | 2          | 1                   | 1                   | -                         | 8                | 11             | 2                  | 0       | 1                 | 1                     | -                | 1       | 1          | 2        | -              | 8                | 14             | 16            | 21              |
| <i>Jacksonia</i> sp. <i>Cottie</i> C.J. Koch 177      | -       | 3                     | 2                   | 1                        | 1      | 0          | 1                   | 1                   | 1                         | 10               | 9              | 1                  | 0       | 0                 | 1                     | 1                | 1       | 2          | 1        | 0              | 7                | 15             | 17            | 20              |

Table 1: CFR Declared Rare Flora Scored (0 - 3) according to degree of threat and urgency for management and/or research action. Page 4.

|  | Disease  | Small/few populations | Transport corridors | Disturbance opportunists | Mining | Recreation | Habitat degradation | Environmental weeds | Inappropriate fire regime | Total of Threats | Rank of Threat | Survey populations | Fencing | Land acquisitions | Germ plasm collection | Re-establishment | Laision | Monitoring | Research | Linear marking | Total of Actions | Rank of Action | Overall Total | Overall Ranking |
|--|--|-----------------------|---------------------|--------------------------|--------|------------|---------------------|---------------------|---------------------------|------------------|----------------|--------------------|---------|-------------------|-----------------------|------------------|---------|------------|----------|----------------|------------------|----------------|---------------|-----------------|
|  | <i>Kennedia macrophylla</i>                                    | 2                     | 2                   | 1                        | 0      | 1          | 2                   | -                   | 1                         | 9                | 10             | 2                  | 0       | 0                 | 0                     | 1                | 1       | 2          | 1        | 2              | 9                | 13             | 18            | 19              |
|  | <i>Lambertia echinata</i><br>subsp. <i>occidentalis</i>        | 3                     | 0                   | -                        | 0      | 1          | -                   | 2                   | 3                         | 12               | 7              | 3                  | 1       | 1                 | 2                     | 3                | 3       | 3          | 3        | 1              | 20               | 3              | 32            | 5               |
|  | <i>Lambertia orbifolia</i>                                     | 3                     | 1                   | 2                        | 2      | 1          | 3                   | 2                   | 2                         | 17               | 3              | 1                  | 2       | 3                 | 0                     | 0                | 2       | 1          | 1        | 1              | 11               | 11             | 28            | 9               |
|  | <i>Laxmannia jamesii</i>                                       | 0                     | 2                   | 2                        | 0      | 1          | 1                   | 2                   | 2                         | 10               | 9              | 3                  | 0       | 0                 | 1                     | 1                | 1       | 2          | 1        | 1              | 10               | 12             | 20            | 17              |
|  | <i>Leptomeria dielsiana</i>                                    | -                     | 3                   | -                        | -      | -          | -                   | -                   | -                         | 3                | 15             | 3                  | -       | -                 | 3                     | -                | 1       | 3          | -        | -              | 10               | 12             | 13            | 24              |
|  | <i>Meziella trifida</i>  | 2                     | 3                   | 0                        | 0      | 1          | 1                   | -                   | -                         | 7                | 12             | 2                  | 0       | 0                 | 1                     | 1                | 1       | 2          | 2        | 1              | 10               | 12             | 17            | 20              |
|  | <i>Petrophile latericola</i> ms                                | 3                     | 3                   | 2                        | 2      | 2          | 2                   | 2                   | 2                         | 20               | 1              | 1                  | 2       | 0                 | 1                     | -                | 2       | 3          | -        | 2              | 11               | 11             | 31            | 6               |
|  | <i>Rulingia</i> sp. Trigwell<br>Bridge R Smith s.n.<br>20/6/89 | 0                     | 3                   | 0                        | 0      | 1          | 1                   | 1                   | 3                         | 8                | 13             | 3                  | 0       | 2                 | 1                     | 3                | 3       | 3          | 3        | 1              | 19               | 4              | 27            | 10              |
|  | <i>Tetrania australiensis</i>                                  | -                     | 2                   | 0                        | 1      | 1          | 1                   | 1                   | 1                         | 8                | 11             | 1                  | 0       | 0                 | 1                     | 0                | 1       | 1          | 2        | 1              | 7                | 15             | 15            | 22              |
|  | <i>Verticordia densiflora</i><br>var. <i>pedunculata</i>       | 2                     | 2                   | -                        | 1      | 1          | 1                   | 2                   | 2                         | 13               | 6              | 1                  | 0       | 1                 | 1                     | 0                | 2       | 2          | -        | 2              | 9                | 13             | 22            | 15              |



**Table 1: CFR Declared Rare Flora Scored (0 - 3) according to degree of threat and urgency for management and/or research action. Page 5.**

|  | Disease   | Small/few populations | Transport corridors | Disturbance opportunists | Mining    | Recreation | Habitat degradation | Environmental weeds | Inappropriate fire regime | Total of Threats | Rank of Threat | Survey populations | Fencing   | Land acquisitions | Germ plasm collection | Re-establishment | Liaison   | Monitoring | Research  | Linear marking | Total of Actions | Rank of Action | Overall Total | Overall Ranking |
|--|-----------|-----------------------|---------------------|--------------------------|-----------|------------|---------------------|---------------------|---------------------------|------------------|----------------|--------------------|-----------|-------------------|-----------------------|------------------|-----------|------------|-----------|----------------|------------------|----------------|---------------|-----------------|
| <i>Vericordia plumosa</i><br>var. <i>ananeotes</i> | -         | 2                     | 2                   | 3                        | 1         | 2          | 2                   | 3                   | 2                         | 17               | 3              | 3                  | 2         | 3                 | 2                     | 3                | 3         | 3          | 3         | 2              | 24               | 1              | 41            | 1               |
| <i>Vericordia plumosa</i><br>var. <i>vassensis</i> | -         | 2                     | 3                   | 2                        | 1         | 1          | 3                   | 3                   | 2                         | 17               | 3              | 2                  | 1         | 2                 | 1                     | 0                | 3         | 2          | 1         | 1              | 13               | 9              | 30            | 7               |
| <i>Wurmbea calicicola</i>                          | 0         | 1                     | 0                   | 2                        | 0         | 2          | 1                   | 1                   | -                         | 7                | 12             | 2                  | 0         | 0                 | 1                     | -                | 1         | 3          | 3         | 1              | 11               | 11             | 18            | 19              |
| <b>Totals</b>                                      | <b>42</b> | <b>88</b>             | <b>42</b>           | <b>35</b>                | <b>18</b> | <b>46</b>  | <b>55</b>           | <b>47</b>           | <b>64</b>                 |                  |                | <b>67</b>          | <b>21</b> | <b>29</b>         | <b>68</b>             | <b>36</b>        | <b>70</b> | <b>81</b>  | <b>77</b> | <b>43</b>      |                  |                |               |                 |

Table 2 CFR Priority One Flora Scored (0 - 3) according to degree of threat and urgency for management and/or research action

|  | Disease | Small/few populations | Transport corridors | Disturbance opportunists | Mining | Recreation | Habitat degradation | Environmental weeds | Inappropriate fire regime | Total of Threats | Rank of Threat | Survey populations | Land acquisitions | Fencing | Germ plasm collection | Re-establishment | Liaison | Monitoring | Research | Linear marking | Total of Actions | Rank of Action | Overall Total | Overall Ranking |
|--|---------|-----------------------|---------------------|--------------------------|--------|------------|---------------------|---------------------|---------------------------|------------------|----------------|--------------------|-------------------|---------|-----------------------|------------------|---------|------------|----------|----------------|------------------|----------------|---------------|-----------------|
| <i>Andersonia ferricola</i> ms                                 | 3       | 1                     | 2                   | -                        | 1      | 1          | 1                   | 2                   | -                         | 11               | 2              | 2                  | 0                 | 0       | -                     | 0                | 1       | 1          | -        | 1              | 5                | 7              | 16            | 4               |
| <i>Boronia humifusa</i>  | -       | 2                     | 1                   | 1                        | 0      | 1          | 0                   | 1                   | 1                         | 7                | 5              | 2                  | 0                 | 0       | 0                     | 0                | 1       | 1          | 0        | 1              | 5                | 7              | 12            | 8               |
| <i>Boronia juncea</i> subsp. <i>juncea</i>                     | -       | 3                     | 0                   | -                        | 2      | -          | 2                   | -                   | -                         | 7                | 5              | 2                  | 1                 | -       | 1                     | 2                | 2       | 2          | -        | -              | 8                | 4              | 15            | 5               |
| <i>Caladenia longicauda</i> subsp. <i>civicola</i> ms          | 0       | 1                     | 1                   | 1                        | 0      | 1          | 1                   | -                   | 0                         | 5                | 7              | 2                  | 0                 | 0       | -                     | 0                | 1       | 1          | -        | 1              | 5                | 7              | 10            | 10              |
| <i>Caladenia uliginosa</i> subsp. <i>patulens</i> ms           | 1       | 2                     | 0                   | 1                        | 0      | 1          | 1                   | 2                   | 1                         | 9                | 3              | 2                  | 0                 | 0       | 1                     | -                | 1       | 2          | 2        | -              | 8                | 4              | 17            | 3               |
| <i>Calothamnus</i> sp. <i>Whicher</i> (BJ Keighery & N Gibson) | -       | 0                     | 2                   | 1                        | 1      | 1          | 1                   | 1                   | 1                         | 8                | 4              | 1                  | 0                 | 1       | -                     | 0                | 1       | 1          | 0        | 1              | 5                | 7              | 13            | 7               |
| <i>Carex tereticaulis</i>                                      | -       | 3                     | 0                   | -                        | 0      | 0          | -                   | -                   | -                         | 3                | 9              | 2                  | -                 | -       | 1                     | -                | 2       | 2          | -        | 1              | 8                | 4              | 11            | 9               |
| <i>Causis</i> sp. <i>Boyanup</i> GS <i>McCutcheon</i> 1706     | -       | 2                     | 0                   | -                        | 1      | 1          | -                   | -                   | -                         | 4                | 8              | 2                  | 0                 | 0       | -                     | -                | 1       | 1          | 2        | -              | 6                | 6              | 10            | 10              |
| <i>Chorizanthe jacksonii</i> ms                                | -       | 1                     | 1                   | -                        | 1      | 1          | 1                   | -                   | -                         | 5                | 7              | 2                  | 0                 | 0       | -                     | -                | 1       | 1          | -        | 1              | 5                | 7              | 10            | 10              |
| <i>Conospermum caeruleum</i> subsp. <i>confortum</i>           | -       | 3                     | -                   | -                        | -      | -          | -                   | -                   | -                         | 3                | 9              | 3                  | -                 | -       | 1                     | -                | -       | -          | 3        | -              | 7                | 5              | 10            | 10              |

Table 2 CFR Priority One Flora Scored (0 - 3) according to degree of threat and urgency for management and/or research action. Page 2.

|  | Disease | Small/few populations | Transport corridors | Disturbance opportunists | Mining | Recreation | Habitat degradation | Environmental weeds | Inappropriate fire regime | Total of Threats | Rank of Threat | Survey populations | Land acquisitions | Fencing | Germ plasm collection | Re-establishment | Liaison | Monitoring | Research | Linear marking | Total of Actions | Rank of Action | Overall Total | Overall Ranking |
|--|---------|-----------------------|---------------------|--------------------------|--------|------------|---------------------|---------------------|---------------------------|------------------|----------------|--------------------|-------------------|---------|-----------------------|------------------|---------|------------|----------|----------------|------------------|----------------|---------------|-----------------|
| <i>Eryngium subdecumbens</i> ms  | -       | 3                     | 0                   | -                        | 0      | 0          | 2                   | 2                   | 1                         | 8                | 4              | 2                  | 0                 | 0       | 1                     | -                | 1       | 1          | -        | 0              | 5                | 7              | 13            | 7               |
| <i>Eucalyptus lane-pooliei</i> var. <i>Whicher</i>   | -       | 3                     | 0                   | -                        | 0      | 1          | -                   | -                   | -                         | 4                | 8              | 2                  | 0                 | 0       | 2                     | 2                | 1       | 1          | 2        | -              | 10               | 2              | 14            | 6               |
| <i>Eucalyptus x mundijongensis</i> <i>Grevillea</i> sp. <i>Scott</i> <i>River GJ Keighery</i> 4070 [aff. <i>manglesoides</i> ] | -       | 3                     | 0                   | -                        | -      | -          | 1                   | -                   | -                         | 4                | 8              | 1                  | 2                 | -       | 1                     | -                | 1       | 1          | 3        | 0              | 9                | 3              | 13            | 7               |
| <i>Haloragis tenuifolia</i>  | -       | 3                     | 2                   | -                        | -      | -          | 2                   | 2                   | -                         | 7                | 5              | 1                  | 0                 | -       | -                     | -                | 2       | 1          | 1        | -              | 5                | 7              | 12            | 8               |
| <i>Hemigenia ramosissima</i>   | -       | 3                     | 3                   | -                        | 1      | 1          | 2                   | 2                   | 2                         | 14               | 1              | 2                  | -                 | -       | 1                     | -                | 1       | 2          | -        | 1              | 7                | 5              | 21            | 1               |
| <i>Johnsonia inconspicua</i>   | 0       | 2                     | 1                   | -                        | 0      | 1          | 0                   | -                   | -                         | 4                | 8              | 2                  | 0                 | 0       | 1                     | -                | 2       | 1          | 1        | -              | 7                | 5              | 11            | 9               |
| <i>Nemcia cordata</i> ms   | 0       | 3                     | 1                   | 1                        | 0      | 0          | 1                   | 1                   | 0                         | 7                | 5              | 2                  | -                 | -       | 1                     | -                | 1       | 2          | -        | 1              | 7                | 5              | 14            | 6               |
| <i>Phylidrella pygmaea</i> subsp. <i>minima</i>  | -       | 3                     | 0                   | -                        | 1      | 0          | -                   | -                   | -                         | 4                | 8              | 3                  | -                 | -       | 1                     | -                | 1       | 2          | -        | -              | 7                | 5              | 11            | 9               |
| <i>Pterostylis turfosa</i>   | 1       | 2                     | 0                   | -                        | 0      | 1          | 0                   | 1                   | 1                         | 6                | 6              | 2                  | 0                 | 0       | 1                     | -                | 1       | 1          | -        | 1              | 6                | 6              | 12            | 8               |

Table 2 CFR Priority One Flora Scored (0 - 3) according to degree of threat and urgency for management and/or research action. Page 3.

|  | Disease  | Small/few populations | Transport corridors | Disturbance opportunists | Mining   | Recreation | Habitat degradation | Environmental weeds | Inappropriate fire regime | Total of Threats | Rank of Threat | Survey populations | Land acquisitions | Fencing  | Germ plasm collection | Re-establishment | Liaison   | Monitoring | Research  | Linear marking | Total of Actions | Rank of Action | Overall Total | Overall Ranking |
|--|--|-----------------------|---------------------|--------------------------|----------|------------|---------------------|---------------------|---------------------------|------------------|----------------|--------------------|-------------------|----------|-----------------------|------------------|-----------|------------|-----------|----------------|------------------|----------------|---------------|-----------------|
|  | <i>Schoenus inidulus</i>                       | -                     | 3                   | 0                        | 0        | 1          | -                   | -                   | 1                         | 5                | 7              | 3                  | 0                 | 0        | 1                     | -                | 1         | 2          | -         | 1              | 8                | 4              | 13            | 7               |
|  | <i>Schoenus pennisetis</i>                     | -                     | 3                   | 1                        | 0        | 0          | 2                   | 1                   | 1                         | 8                | 4              | 2                  | -                 | -        | 1                     | -                | 1         | 2          | -         | 1              | 7                | 5              | 15            | 5               |
|  | <i>Schoenus</i> sp. Jindong<br>(RD Royce 2485) | -                     | 3                   | 0                        | -        | -          | 2                   | -                   | -                         | 5                | 7              | 3                  | -                 | -        | 1                     | -                | 2         | -          | -         | -              | 6                | 6              | 11            | 9               |
|  | <i>Stylidium rhipidium</i>                     | -                     | 1                   | 0                        | -        | 2          | 1                   | 2                   | -                         | 6                | 6              | 3                  | 1                 | -        | -                     | -                | 2         | 1          | 3         | -              | 10               | 2              | 16            | 4               |
|  | <i>Stylidium tylosum</i>                       | -                     | 3                   | -                        | -        | -          | -                   | 1                   | -                         | 4                | 8              | 3                  | -                 | -        | 1                     | -                | 2         | 1          | -         | 1              | 8                | 4              | 12            | 8               |
|  | <i>Synaphea macrophylla</i>                    | -                     | 3                   | 2                        | -        | 0          | 2                   | -                   | -                         | 7                | 5              | 3                  | 1                 | 1        | 1                     | -                | 2         | 2          | -         | 1              | 11               | 1              | 18            | 2               |
|  | <i>Synaphea nexosa</i>                         | -                     | 3                   | 2                        | -        | 0          | 2                   | -                   | -                         | 7                | 5              | 3                  | 0                 | -        | 1                     | -                | 2         | 2          | -         | 1              | 9                | 3              | 16            | 4               |
|  | <i>Synaphea otio stigma</i>                    | -                     | 2                   | 1                        | -        | 0          | 1                   | -                   | -                         | 4                | 8              | 3                  | 0                 | -        | 1                     | -                | 1         | 2          | 0         | 1              | 8                | 4              | 12            | 8               |
|  | <i>Synaphea stenoloba</i>                      | -                     | 3                   | 2                        | -        | 0          | -                   | 2                   | -                         | 7                | 5              | 3                  | -                 | -        | 1                     | -                | 2         | 2          | -         | 1              | 9                | 3              | 16            | 4               |
|  | <i>Thomasia laxiflora</i>                      | -                     | 2                   | 1                        | -        | 1          | 0                   | 0                   | -                         | 5                | 7              | 2                  | 0                 | 0        | 1                     | -                | 1         | 1          | -         | 1              | 6                | 6              | 11            | 9               |
|  | <i>Thysanotus formosus</i>                     | -                     | 3                   | 2                        | -        | 0          | 1                   | -                   | 2                         | 8                | 4              | 3                  | 0                 | 0        | 1                     | 0                | 1         | 1          | 1         | 1              | 8                | 4              | 16            | 4               |
|  | <b>Totals</b>                                  | <b>5</b>              | <b>73</b>           | <b>27</b>                | <b>5</b> | <b>11</b>  | <b>15</b>           | <b>25</b>           | <b>17</b>                 | <b>191</b>       |                | <b>70</b>          | <b>5</b>          | <b>2</b> | <b>24</b>             | <b>2</b>         | <b>41</b> | <b>41</b>  | <b>18</b> | <b>18</b>      | <b>221</b>       |                |               |                 |

**Table 3: CFR Declared Rare Flora Overall Ranking for Management and Research Action**

| Overall Ranking  |    | Overall Ranking  |    |
|--|----|--|----|
| <i>Verticordia plumosa</i> var. <i>ananeotes</i>         | 1  | <i>Caladenia bryceana</i> R.S.Rogers subsp. <i>bryceana</i> ms | 13 |
| <i>Caladenia busselliana</i> ms                          | 2  | <i>Diuris purdiei</i>  | 13 |
| <i>Boronia exilis</i>                                    | 3  | <i>Eleocharis keigheryi</i>                                    | 14 |
| <i>Grevillea maccutcheonii</i>                           | 3  | <i>Caladenia dorrienii</i>                                     | 15 |
| <i>Caladenia viridescens</i> ms                          | 4  | <i>Verticordia densiflora</i> var. <i>pedunculata</i>          | 15 |
| <i>Lambertia echinata</i> subsp. <i>occidentalis</i>     | 5  | <i>Grevillea brachystylis</i> subsp. <i>australis</i>          | 16 |
| <i>Petrophile latericola</i> ms                          | 6  | <i>Laxmannia jamesii</i>                                       | 17 |
| <i>Brachysema papilio</i>                                | 7  | <i>Caladenia huegelii</i>                                      | 18 |
| <i>Darwinia ferricola</i> ms                             | 7  | <i>Drakaea elastica</i>  | 19 |
| <i>Darwinia</i> sp. Williamson [aff. <i>apiculata</i> ]  | 7  | <i>Dryandra mimica</i>   | 19 |
| <i>Verticordia plumosa</i> var. <i>vassensis</i>         | 7  | <i>Kennedia macrophylla</i>                                    | 19 |
| <i>Dryandra nivea</i> subsp. <i>uliginosa</i>            | 8  | <i>Wurmbea calcicola</i>                                       | 19 |
| <i>Grevillea elongata</i>                                | 8  | <i>Drakaea micrantha</i> ms                                    | 20 |
| <i>Drakaea confluens</i> ms                              | 9  | <i>Jacksonia</i> sp. Collie CJ Koch 177                        | 20 |
| <i>Lambertia orbifolia</i>                               | 9  | <i>Meziella trifida</i>  | 20 |
| <i>Rulingia</i> sp. Trigwell Bridge R Smith s.n. 20/6/89 | 10 | <i>Grevillea rara</i>  | 21 |
| <i>Caladenia excelsa</i> ms                              | 11 | <i>Caladenia harringtoniae</i> ms                              | 22 |
| <i>Chamelaucium roycei</i> ms                            | 11 | <i>Tetralia australiensis</i>                                  | 22 |
| <i>Dryandra squarrosa</i> subsp. <i>argillacea</i>       | 11 | <i>Daviesia elongata</i> subsp. <i>elongata</i>                | 23 |
| <i>Caladenia caesarea</i> subsp. <i>maritima</i> ms      | 12 | <i>Leptomeria dielsiana</i>                                    | 24 |
| <i>Eucalyptus phylacis</i>                               | 12 | <i>Diuris micrantha</i>  | 25 |
| <i>Brachysema modestum</i>                               | 13 |  |    |

**Table 4: CFR Priority 1 Flora Overall Ranking for Management and Research Action**

| Overall Ranking   |   | Overall Ranking  |    |
|---|---|--|----|
| <i>Hemigenia ramosissima</i>  | 1 | <i>Haloragis tenuifolia</i>                            | 9  |
| <i>Synaphea macrophylla</i>   | 2 | <i>Johnsonia inconspicua</i>                           | 9  |
| <i>Caladenia uliginosa</i> subsp. <i>patulens</i> ms                          | 3 | <i>Philydrella pygmaea</i> subsp. <i>minima</i>        | 9  |
| <i>Andersonia ferricolams</i>   | 4 | <i>Schoenus</i> sp. Jindong (RD Royce 2485)            | 9  |
| <i>Stylidium rhipidium</i>  | 4 | <i>Thomasia laxiflora</i>                              | 9  |
| <i>Synaphea nexosa</i>  | 4 | <i>Caladenia longicauda</i> subsp. <i>clivicola</i> ms | 10 |
| <i>Synaphea stenoloba</i>   | 4 | <i>Caustis</i> sp. Boyanup GS McCutcheon 1706          | 10 |
| <i>Thysanotus formosus</i>  | 4 | <i>Chordifex jacksonii</i> ms                          | 10 |
| <i>Boronia juncea</i> subsp. <i>juncea</i>                                    | 5 | <i>Conospermum caeruleum</i> subsp. <i>contortum</i>   | 10 |
| <i>Schoenus pennisetis</i>  | 5 |  |    |
| <i>Eucalyptus lane-poolei</i> var. <i>Whicher</i>                             | 6 |  |    |
| <i>Nemcia cordata</i> ms  | 6 |  |    |
| <i>Calothamnus</i> sp. <i>Whicher</i> (BJ Keighery & N Gibson)                | 7 |  |    |
| <i>Eryngium subdecumbens</i> ms   | 7 |  |    |
| <i>Eucalyptus x mundijongensis</i>  | 7 |  |    |
| <i>Schoenus indutus</i>   | 7 |  |    |
| <i>Boronia humifusa</i>   | 8 |  |    |
| <i>Grevillea</i> sp. Scott River GJ Keighery 4070 [aff. <i>manglesoides</i> ] | 8 |  |    |
| <i>Pterostylis turfosa</i>  | 8 |  |    |
| <i>Stylidium tylosum</i>  | 8 |  |    |
| <i>Synaphea otlostigma</i>  | 8 |  |    |
| <i>Carex tereficaulis</i>   | 9 |  |    |

**Table 5. Declared Rare and Poorly Known Flora in the Central Forest Region as at 1998. Conservation status updated to December 1999.**

| <b>DECLARED RARE FLORA</b>  |                   |  |
|---|-------------------|--|
| Extant Taxa   | Conservation code |  |
| <i>Boronia exilis</i> .....   | R                 |  |
| <i>Brachysema modestum</i> .....                                    | R                 |  |
| <i>Brachysema papilio</i> .....                                     | R                 |  |
| <i>Caladenia bryceana</i> subsp. <i>bryceana</i> ms .....           | R                 |  |
| <i>Caladenia busselliana</i> ms.....                                | R                 |  |
| <i>Caladenia caesarea</i> subsp. <i>maritima</i> ms .....           | R                 |  |
| <i>Caladenia christineae</i> ms .....                               | R                 |  |
| <i>Caladenia dorrienii</i> .....                                    | R                 |  |
| <i>Caladenia excelsa</i> ms .....                                   | R                 |  |
| <i>Caladenia harringtoniae</i> ms.....                              | R                 |  |
| <i>Caladenia huegelii</i> .....                                     | R                 |  |
| <i>Caladenia viridescens</i> ms .....                               | R                 |  |
| <i>Chamelaucium roycei</i> ms .....                                 | R                 |  |
| <i>Darwinia ferricola</i> ms .....                                  | R                 |  |
| <i>Darwinia</i> sp. Williamson<br>(G.J. Keighery 12717).....        | R                 |  |
| <i>Daviesia elongata</i> subsp. <i>elongata</i> .....               | R                 |  |
| <i>Diuris micrantha</i> .....                                       | R                 |  |
| <i>Diuris purdiei</i> .....   | R                 |  |
| <i>Drakaea confluens</i> ms .....                                   | R                 |  |
| <i>Drakaea elastica</i> .....                                       | R                 |  |
| <i>Drakaea micrantha</i> ms .....                                   | R                 |  |
| <i>Dryandra mimica</i> .....  | R                 |  |
| <i>Dryandra nivea</i> subsp. <i>uliginosa</i> .....                 | R                 |  |
| <i>Dryandra squarrosa</i> subsp. <i>argillacea</i> .....            | R                 |  |
| <i>Eleocharis keigheryi</i> .....                                   | R                 |  |
| <i>Eucalyptus phylacis</i> .....                                    | R                 |  |
| <i>Grevillea brachystylis</i> subsp. <i>australis</i> .....         | R                 |  |
| <i>Grevillea elongata</i> .....                                     | R                 |  |
| <i>Grevillea maccutcheonii</i> .....                                | R                 |  |
| <i>Grevillea rara</i> .....   | R                 |  |
| <i>Jacksonia velveta</i> ms .....                                   | R                 |  |
| <i>Kennedia macrophylla</i> .....                                   | R                 |  |
| <i>Lambertia echinata</i> subsp. <i>occidentalis</i> .....          | R                 |  |
| <i>Lambertia orbifolia</i> .....                                    | R                 |  |
| <i>Laxmannia jamesii</i> .....                                      | R                 |  |
| <i>Meziella trifida</i> .....                                       | R                 |  |
| <i>Petrophile latericola</i> ms .....                               | R                 |  |
| <i>Rulingia</i> sp. Trigwell Bridge<br>(R. Smith s.n. 20.6.89)..... | R                 |  |
| <i>Tetraria australiensis</i> .....                                 | R                 |  |
| <i>Verticordia densiflora</i> var. <i>pedunculata</i> .....         | R                 |  |
| <i>Verticordia plumosa</i> var. <i>ananeotes</i> .....              | R                 |  |
| <i>Verticordia plumosa</i> var. <i>vassensis</i> .....              | R                 |  |
| <i>Wurmbea calcicola</i> .....                                      | R                 |  |
|   |                   | <b>Presumed Extinct Taxa</b>   |
|   |                   | <i>Leptomeria dielsiana</i> .....  |
|   |                   | X  |
|   |                   | <b>Priority One Taxa</b>   |
|   |                   | <i>Andersonia ferricola</i> ms .....   |
|   |                   | P1   |
|   |                   | <i>Boronia humifusa</i> .....  |
|   |                   | P1   |
|   |                   | <i>Boronia juncea</i> subsp. <i>juncea</i> .....                             |
|   |                   | P1   |
|   |                   | <i>Caladenia longicauda</i> subsp.<br><i>clivicola</i> ms .....              |
|   |                   | P1   |
|   |                   | <i>Caladenia uliginosa</i> subsp. <i>patulens</i> ms.....                    |
|   |                   | P1   |
|   |                   | <i>Calothamnus</i> sp. Wicher (B.J. Keighery<br>& N. Gibson 230).....        |
|   |                   | P1   |
|   |                   | <i>Carex tereticaulis</i> .....  |
|   |                   | P1   |
|   |                   | <i>Caustis</i> sp. Boyanup (G.S. McCutcheon<br>1706) .....                   |
|   |                   | P1   |
|   |                   | <i>Chordifex jacksonii</i> ms .....  |
|   |                   | P2   |
|   |                   | <i>Conospermum caeruleum</i> subsp.<br><i>contortum</i> .....                |
|   |                   | P1   |
|   |                   | <i>Eryngium subdecumbens</i> ms.....   |
|   |                   | P1   |
|   |                   | <i>Eucalyptus lane-poolei</i> Maiden var.<br>Wicher (S.D. Hopper 6316) ..... |
|   |                   | P1   |
|   |                   | <i>Eucalyptus x mundijongensis</i> .....                                     |
|   |                   | P1   |
|   |                   | <i>Grevillea</i> sp. Scott River (G.J. Keighery<br>4070) .....               |
|   |                   | P1   |
|   |                   | <i>Haloragis tenuifolia</i> .....  |
|   |                   | P1   |
|   |                   | <i>Hemigenia ramosissima</i> .....   |
|   |                   | P2   |
|   |                   | <i>Johnsonia inconspicua</i> .....   |
|   |                   | P1   |
|   |                   | <i>Nemcia cordata</i> ms .....   |
|   |                   | P1   |
|   |                   | <i>Philydrella pygmaea</i> subsp. <i>minima</i> .....                        |
|   |                   | P1   |
|   |                   | <i>Pterostylis turfosa</i> .....   |
|   |                   | P1   |
|   |                   | <i>Schoenus indutus</i> .....  |
|   |                   | P1   |
|   |                   | <i>Schoenus pennisetis</i> .....   |
|   |                   | P1   |
|   |                   | <i>Schoenus</i> sp. Jindong (R.D. Royce 2485).....                           |
|   |                   | P1   |
|   |                   | <i>Stylidium rhipidium</i> .....   |
|   |                   | P3   |
|   |                   | <i>Stylidium tylosum</i> .....   |
|   |                   | P1   |
|   |                   | <i>Synaphea macrophylla</i> .....  |
|   |                   | P1   |
|   |                   | <i>Synaphea nexosa</i> .....   |
|   |                   | P1   |
|   |                   | <i>Synaphea otlostigma</i> .....   |
|   |                   | P1   |
|   |                   | <i>Synaphea stenoloba</i> .....  |
|   |                   | R  |
|   |                   | <i>Thomasia laxiflora</i> .....  |
|   |                   | P1   |
|   |                   | <i>Thysanotus formosus</i> .....   |
|   |                   | P1   |

## Priority Two Flora

|   |    |
|---|----|
| <i>Acacia mooreana</i> .....Delete  |    |
| <i>Acacia oncinopylla</i> subsp. <i>patulifolia</i> .....                               | P2 |
| <i>Acacia subracemosa</i> .....   | P2 |
| <i>Actinotus whicheranus</i> .....  | P2 |
| <i>Amperea micrantha</i> .....  | P2 |
| <i>Amperea protensa</i> .....   | P2 |
| <i>Andersonia auriculata</i> .....  | P2 |
| <i>Apodasmia ceramophila</i> ms.....  | P2 |
| <i>Boronia capitata</i> subsp. <i>gracilis</i> .....                                    | P2 |
| <i>Caladenia abbreviata</i> ms.....   | P2 |
| <i>Caladenia caesarea</i> subsp.<br><i>transiens</i> ms.....                            | P2 |
| <i>Calothamnus</i> sp. Scott River<br>(R.D. Royce 84).....                              | P2 |
| <i>Chordifex isomorphus</i> .....   | P2 |
| <i>Conospermum quadripetalum</i> .....  | P2 |
| <i>Dryandra sessilis</i> var. <i>cordata</i> .....                                      | P2 |
| <i>Dryandra subpinnatifida</i> var. <i>imberbis</i> .....                               | P2 |
| <i>Eryngium pinnatifidum</i> subsp.<br><i>palustre</i> ms.....                          | P2 |
| <i>Euphrasia scabra</i> .....   | P2 |
| <i>Fabronia hampeana</i> .....  | P2 |
| <i>Grevillea brachystylis</i> subsp.<br><i>brachystylis</i> .....                       | P2 |
| <i>Grevillea candolleana</i> .....  | P2 |
| <i>Hakea tuberculata</i> .....  | P2 |
| <i>Haloragis aculeolata</i> .....   | P2 |
| <i>Hybanthus volubilis</i> .....  | P2 |
| <i>Hydrocotyle hamelinensis</i> ms.....   | P2 |
| <i>Lasiopetalum membranaceum</i> .....  | P2 |
| <i>Leptinella drummondii</i> .....  | P2 |
| <i>Leptomeria furtiva</i> .....   | P2 |
| <i>Melaleuca incana</i> R.Br. subsp. <i>Gingilup</i><br>(N. Gibson & M. Lyons 593)..... | P2 |
| <i>Millotia tenuifolia</i> var. <i>laevis</i> .....                                     | P2 |
| <i>Mitreola minima</i> .....  | P2 |
| <i>Schoenus capillifolius</i> .....   | P2 |
| <i>Schoenus loliaceus</i> .....   | P2 |
| <i>Spyridium spadiceum</i> .....  | P2 |
| <i>Stylidium paulineae</i> .....  | P2 |
| <i>Stylidium rigidifolium</i> .....   | P2 |
| <i>Synaphea petiolaris</i> subsp. <i>simplex</i> .....                                  | P2 |
| <i>Trichocline</i> sp. Treeton (B.J. Keighery<br>& N. Gibson 564).....                  | P2 |

## Priority Three Taxa

|  |    |
|--|----|
| <i>Acacia inops</i> .....  | P3 |
| <i>Acacia lateriticola</i> glabrous variant<br>(B.R. Maslin 6765)..... | P3 |
| <i>Acacia lullfitziorum</i> .....                                      | P3 |
| <i>Acacia semitrullata</i> .....                                       | P3 |
| <i>Actinotus</i> sp. Walpole<br>(J.R. Wheeler 3786).....               | P3 |
| <i>Adenanthos cygnorum</i> subsp.<br><i>chamaephyton</i> .....         | P3 |
| <i>Andersonia amabile</i> ms.....                                      | P3 |
| <i>Aotus cordifolia</i> .....  | P3 |
| <i>Blennospora</i> sp. Ruabon<br>(B.J. Keighery & N. Gibson 20).....   | P3 |
| <i>Boronia anceps</i> .....  | P3 |
| <i>Boronia tetragona</i> .....   | P3 |
| <i>Bossiaea disticha</i> .....   | P3 |
| <i>Calytrix pulchella</i> .....  | P3 |
| <i>Chamaescilla gibsonii</i> ms.....                                   | P3 |
| <i>Chordifex gracilior</i> .....                                       | P3 |
| <i>Chorizandra multiarticulata</i> .....                               | P3 |
| <i>Chorizema carinatum</i> .....                                       | P3 |
| <i>Chorizema reticulatum</i> .....                                     | P3 |
| <i>Euchiton collinus</i> .....   | P3 |
| <i>Galium migrans</i> .....  | P3 |
| <i>Grevillea papillosa</i> .....                                       | P3 |
| <i>Grevillea prominens</i> .....                                       | P3 |
| <i>Hakea oldfieldii</i> .....  | P3 |
| <i>Hibbertia spicata</i> subsp. <i>leptotheca</i> .....                | P3 |
| <i>Isopogon formosus</i> subsp. <i>dasylepis</i> .....                 | P3 |
| <i>Jansonia formosa</i> .....  | P3 |
| <i>Lambertia multiflora</i> var. <i>darlingensis</i> .....             | P3 |
| <i>Lepyrodia heleocharoides</i> .....                                  | P3 |
| <i>Loxocarya magna</i> .....   | P3 |
| <i>Myriophyllum echinatum</i> .....                                    | P3 |
| <i>Platysace ramosissima</i> .....                                     | P3 |
| <i>Pultenaea pinifolia</i> .....                                       | P3 |
| <i>Pultenaea radiata</i> .....   | P3 |
| <i>Rhodanthe pyrethrum</i> .....                                       | P3 |
| <i>Schoenus benthamii</i> .....  | P3 |
| <i>Sphenotoma parviflorum</i> .....                                    | P3 |
| <i>Stylidium barleei</i> .....   | P3 |
| <i>Stylidium longitubum</i> .....                                      | P3 |
| <i>Stylidium maritimum</i> .....                                       | P3 |
| <i>Stylidium mimeticum</i> .....                                       | P3 |
| <i>Synaphea hians</i> .....  | P3 |
| <i>Synaphea whicherensis</i> .....                                     | P3 |
| <i>Tetratheca parvifolia</i> .....                                     | P3 |
| <i>Verticordia attenuata</i> .....                                     | P3 |
| <i>Xanthoparmelia hypoleia</i> .....                                   | P3 |

## R Declared Rare Flora - Extant Taxa

Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.



X Declared Rare Flora - Presumed Extinct Taxa

P1 Priority One - Poorly known Taxa

Taxa which are known from one or a few (generally <5) populations which are under threat

P2 Priority Two - Poorly Known Taxa

Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat

P3 Priority Three - Poorly Known Taxa

Taxa that are known from several populations, and the taxa are not believed to be under immediate threat

deleted species has been taken off the Priority Flora list