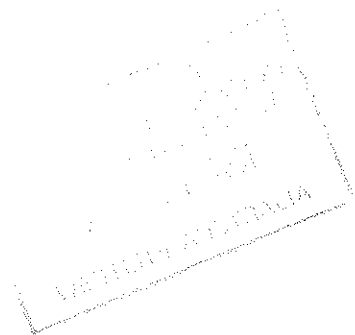


Declared Rare and Poorly Known Flora in the Narrogin District

by Gregory S. Durell and Robert M. Buehrig

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DECLARED RARE AND POORLY KNOWN FLORA IN THE NARROGIN DISTRICT

by

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by
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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 (eg Kangaroos, Noisy Scrub-bird and 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 Narrogin District 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 other resources can be allocated to those taxa most urgently in need of attention.

Priority Flora that are considered to have the greatest requirement for assessment for declaration as rare flora are also specifically dealt with, but in less detail than the Declared Rare Flora. However, the information contained in this Program should assist in the ongoing work of assessing their conservation status.

This Program has been approved by the Executive Director, Department of Conservation and Land Management, the National Parks and Nature Conservation Authority 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 this plan is accurate to 1996.

ACKNOWLEDGMENTS

We are indebted to the many people for their support, assistance and encouragement in the background research, field work and preparation of this document.

The assistance of CALM Narrogin District staff, Peter Batt and Brian MacMahon, during field surveys was appreciated. The support of Tim Bowra in finalising this document is acknowledged.

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Anne Coates' guided tour of Dragon Rocks Nature Reserve was valuable.

The formatting and editing assistance of Michelle Boothey and Sharon Hann is appreciated.

ABBREVIATIONS USED

| | | |
|------|---|--|
| CALM | - | Reserve vested with the Executive Director of CALM |
| CAM | - | Camping Reserve |
| CBH | - | Cooperative Bulk Handling Reserve |
| GRS | - | Shire Gravel Reserve |
| NP | - | National Park |
| NR | - | Nature Reserve |
| PP | - | Private Property |
| REC | - | Recreation Reserve |
| RVM | - | Main Roads Road Verge |
| RVS | - | Shire Road Verge |
| RWR | - | Westrail Reserve |
| SF | - | State Forest |
| SR | - | Shire Reserve (other) |
| TBR | - | Timber Reserve |
| TRS | - | Trig Station |
| TWS | - | Town Site |
| VCL | - | Vacant Crown Land |
| WAR | - | Water Reserve |
| COM | - | Common 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 12 442 current taxa (species, subspecies and varieties) in July 1997 with the total likely to exceed 13 000 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 2 000 Western Australian taxa are currently listed as threatened or have been placed on the Department of Conservation and Land Management's (CALM) Flora Priority List because they are rare or poorly known (K. Atkins, personal communication).

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 have 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. 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 (ie, threatened taxa).

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 Narrogin District as at March 1996. At that time, 302 extant taxa were listed as Declared Rare Flora and a further 27 taxa were listed on the schedule as presumed extinct. In addition to those that were declared rare, 1 866 taxa were listed on CALM's priority flora list. 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) provide illustrations of declared rare (threatened) 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.

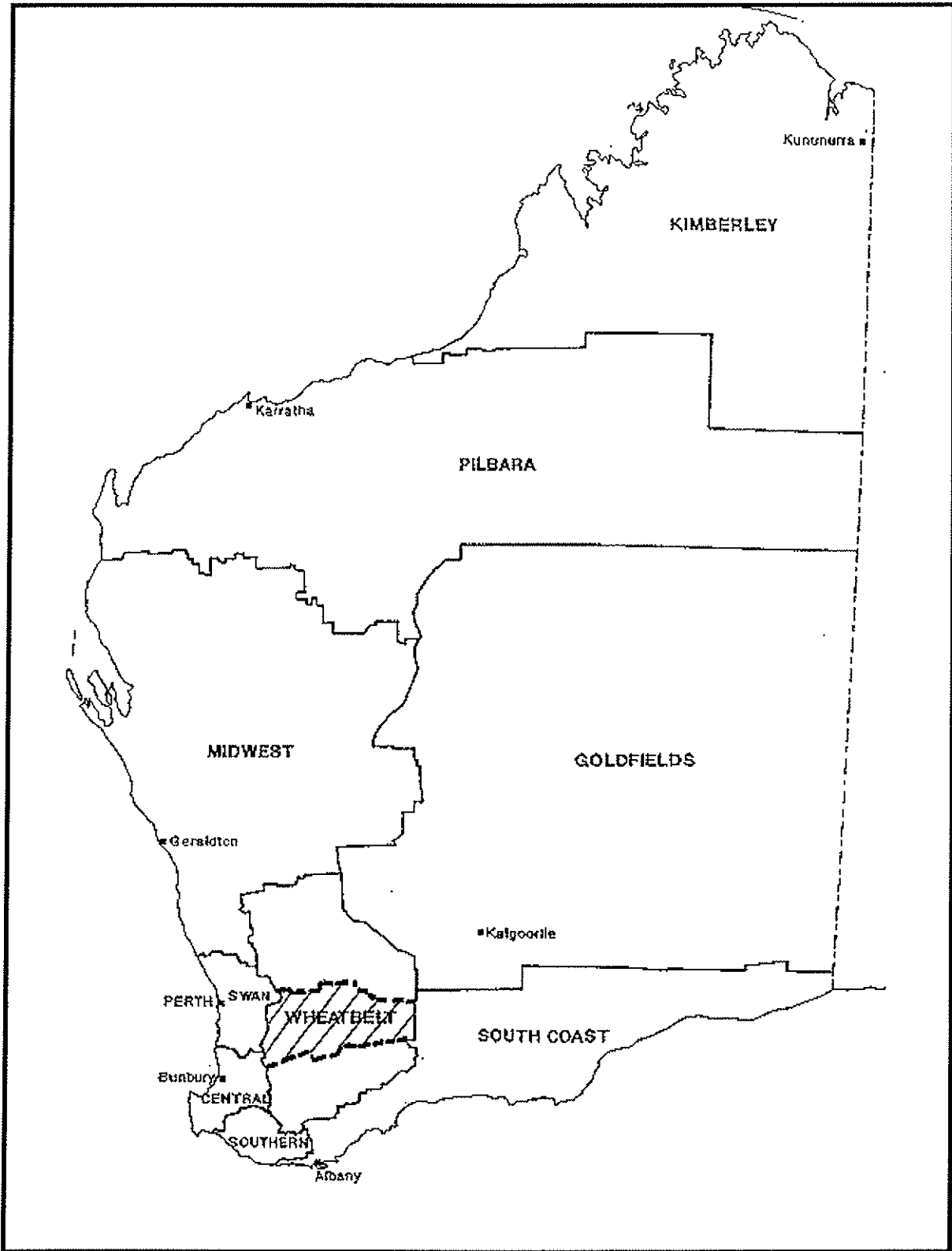


Figure 1. Location of the Narrogin District in relation to CALM Management Regions

2. OBJECTIVE OF THE PROGRAM

The objective of this program for the Narrogin District 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 or other taxa which are poorly known and may be at risk;
- directing Departmental resources within the District to those species most urgently in need of attention;
- assisting in the identification of Declared Rare species and other species potentially at risk, and their likely habitats;
- 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) protects 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 in need of special protection - the taxon is presently not in danger of extinction but is at risk over a longer period through continue 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 within the agreed taxonomic limits for that taxon group;
- capable of being self perpetuating, that is, not reliant on 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' by 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 Crown 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) is well-defined, readily identified and represented by a voucher specimen in a State or National Herbarium. It need not necessarily 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.
- Have been searched for thoroughly in the wild by competent botanists during the past five years in most likely habitats, according to guidelines approved by the Executive Director; and
- Searches have established that the plant in the wild is either rare; in danger of extinction; deemed to be threatened and in need of special protection; or presumed extinct. (ie. the taxon has not been collected from the wild, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently)

Plants may be deleted from the Rare Flora schedule where:

- recent botanical survey has shown that the taxon is no longer rare, endangered or in need of special protection; or
- 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 1866 taxa (at October 1996) that are poorly known and in need of further 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 on the basis of thorough survey or presumed extinct can be included on the DRF schedule.

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

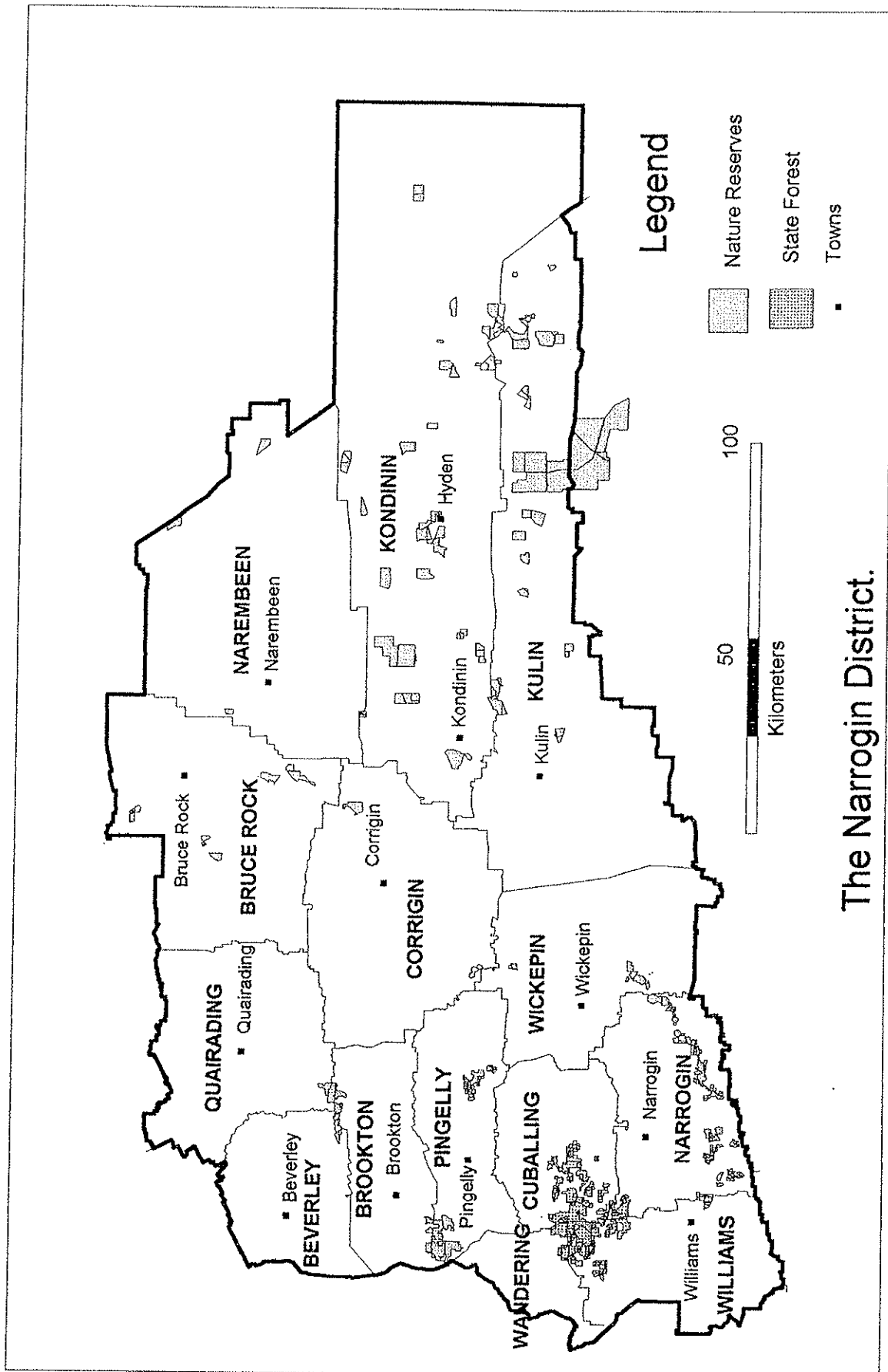


Figure 2. The Narrogin District covered by this Management Plan

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, such as road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, eg 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, and the taxa are not believed to be under immediate threat (ie not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. 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, whilst 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 Bioconservation Group (CALMScience) staff, Wildlife Branch and the Western Australian Threatened Species and Communities Unit (WATSCU) (Nature Conservation Division) and Regional Services Division staff
- 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 staff of Bioconservation Group (CALMScience), Regional Ecologists (Regional Services Division), Wildlife Branch and WATSCU staff;

- 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 Narrogin District;
- Enforcement matters relating to the provisions of the Wildlife Conservation Act are the responsibility of Wildlife Officers in the Wheatbelt Region;
- Implementation and revision of the management program is the responsibility of the Narrogin District Threatened Flora Recovery Team.

6. THE NARROGIN DISTRICT

The Narrogin District lies within the Great Southern and Southern Central Wheatbelt meteorological zones of Western Australia, covering 14 shires, and comprises the central portion of CALM's Wheatbelt Region. The District is approximately located between Latitude 31°50'00"S to 33°30'00"S, and Longitude 116°50'00"E to 120°00'00"E. The District boundaries are irregular and mostly are located along shire boundaries, the exception being the western boundary, where it dissects the shires of Williams, Wandering, Brookton and Beverley.

The total area of CALM managed estate in the District is about 115 815 ha, comprising 220 nature reserves with an area of 87 676 ha. Dragon Rocks Nature Reserve is the largest nature reserve in the District. This 32 203 ha reserve is located across the border of the Narrogin and Katanning District. There are nine other nature reserves which are greater than 2000 ha and twelve over 1000 ha. The smallest nature reserve is 0.5 ha.

There are 28 065 ha of State Forest in the District.

There are no national parks or conservation parks vested in the National Parks and Nature Conservation Authority (NPNCA) in the District. The *Dryandra Woodland Management Plan 1994* recommends that sections of Dryandra State Forest be declared national park.

The District lies within the South-West Botanical Province extending into an inter-zone between the wetter south-west and the arid interior, thus, representing vegetation associations unique to these two areas as well as endemic vegetation associations and taxa. The total land area is approximately 30 500 square kilometres, some 310 kilometres from west to east, and 150 kilometres from north to south.

Ninety percent of the District has been cleared and cereal cropping and sheep grazing are the dominant land-use. The 10% of the natural vegetation remaining is mostly in small isolated pockets that may be unable to maintain their full complement of flora and fauna in the long term.

Many of the District's soils are being affected to some extent by salinity, erosion, acidification, compaction, and water-logging, resulting from vegetation clearing and disruption to the natural water cycle. The water quality of wetland and river habitats has been affected by increasing salinisation, eutrophication and sedimentation. Ground water levels are generally rising throughout the District and are becoming more saline. Rising ground water will continue to threaten areas of farmland, remnant vegetation and Declared Rare and Priority flora taxa.

6.1 Climate

The climate of the Narrogin District is Mediterranean with hot, dry summers and cool, wet winters. Rainfall decreases from 600 mm in the west to about 200 mm in the east .

6.2 Geology, Landforms and Soil

The Narrogin District lies within the South-Western Province of the Yilgarn Block, which is an ancient "Shield" area consisting mainly of Archaean granitic rocks with some metamorphosed volcanic sediments. There are two areas of metamorphic rock in the District. The Jimperding Metamorphic Belt, extends across the north west District corner. This corresponds to the York Vegetation System (described by Beard 1980). The second belt is from Mount Holland to Hatters Hill, in the "Forrestania greenstone belt". This mineralised area corresponds to the Forrestania Vegetation System (Beard 1972).

Deeply weathered granitic rock underlies most of the District. In the western portion the topography is undulating and is less dissected in the east. Laterite ironcap hills, spurs, ridges and colluvium form the steeper slopes. The gently undulating sand plain and duri-crust surface, in the mid portion of the District, is preserved mainly on drainage divides. These are extensively eroded near old drainage systems. An ancient drainage system, marked by salt lakes, exists near Hyden, Kondinin and Corrigin. This system forms part of the Swan-Avon Catchment. Another branch of this drainage system divides and passes near Quairading. Erosion has occurred on the western and north western margins of these valleys resulting in the deposition of low dunes on the eastern and south eastern sides (Beard Corrigin 1986).

In the Hyden area, the main feature is a gently undulating topography on a relict duri-crust peneplain, partially covered by sand plain. Broad valleys also exist with salt-lakes (Beard Hyden 1984).

Throughout the District, laterite which may occur as duri-crust or ironstone gravels and sand, forms spurs and ridges. Also, large bare granite rock monoliths intermittently rise above the surrounding country. In the mineralised greenstone belt, several prominent ridges called North, Middle and South Ironcaps are caused by banded ironstone formations. They rise out of the surrounding landscape.

Further east of the Ironcaps, the drainage lines travel eastwards towards the Nullarbor Plain.

6.3 Vegetation

There are 14 vegetation systems in the Narrogin District described by Beard between 1972-80. These systems are a series of plant associations occurring together that are related to particular topography, soil types or geological features (Specht 1958). Two examples are the York System which corresponds to the Jimperding Metamorphic Belt (Beard 1980) near Beverley and the Forrestania System on the metamorphosed greenstone belt around the Ironcaps (Beard 1972). Within a system, Beard has grouped plants according to outward features or appearance into formations such as woodland, mallee and shrub-heath.

The Narrogin District straddles two Botanical Districts, the boundary is just east of a north - south line joining Corrigin and Harrismith. The western portion, or the Avon District, is characterised by a gently undulating landscape with regular sequences of soil linked to the topography (Beard 1980). Leached sands and laterite occupy higher ground and hard-setting loams occupy the valleys (Beard 1984). The vegetation is situated accordingly, generally with shrub lands on the upper land and woodlands on the valley loams. (Beard 1984).

Heaths dominated by *Dryandra* sp. in association with *Adenanthos*, *Banksia*, *Beaufortia* and *Calothamnus* grow on laterite. Below the breakaways mallets of *Eucalyptus astringens*, *E. gardneri* and *E. argyphaea* may

grow. The principal formation of the upland sand plains are thickets of *Acacia*, *Allocasuarina*, *Melaleuca*, *Banksia prionotes* and *Xylomelum*.

The woodland vegetation associations of the valley loams contain *Eucalyptus loxophleba*, *E. wandoo*, *E. salmonophloia*, *E. longicornis* and *E. salubris*, depending on the location. Salt flats associated with drainage systems may be bare or vegetated with samphire. The associated dunes fringing salt lakes may contain scattered *E. loxophleba*, *E. sargentii*, *E. kondininensis*, *Casuarina obesa*, *Acacia* spp., *Melaleuca uncinata* and other *Melaleuca* spp. Adjacent to or on Granite outcrops may grow low woodland of *Acacia acuminata* and *Allocasuarina huegeliana* (raspberry jam and rock sheoak) with *Borja* sp., and various other plants that inhabit granite rock crevices or live on the surrounding shallow gritty sandy soils.

On the western fringe of the District is a small area of jarrah forest and marri-wandoo woodland (Beard 1984).

The Roe Botanical District and the Hyden System occupy most of the eastern half of the District. Here, the landscape is very gently undulating with wide flat broad valleys, long gentle slopes and broad divides (Beard 1980). There is a high variability in soils that results in a mosaic character displayed by the vegetation. Nevertheless, on a broad scale the system is characterised as heath and thicket on sand plains, mallee covering most of the area and growing on the slopes, mallee with patches of woodland on the upper valley soils, woodland on lower valley soils, and a mosaic of woodland, shrubland and samphire in the more saline areas.

East of the Number 1 Rabbit Proof Fence, is the most extensive area of native vegetation. It also includes the Forrestania System, which consist of woodlands of *E. salmonophloia*, *E. longicornis*, *E. salubris* and *E. flocktoniae* vegetation associations, that have developed on the greenstone belt. This system is mostly in mosaic form, and consists of numerous vegetation communities that are influenced by the underlying geology (Beard 1972). Distinct assemblages of heath and thicket grow on the abrupt rocky ridges formed by banded ironstone. The greenstone, of basaltic nature, weathers to form fairly flat country with heavy soils supporting sclerophyll woodlands. There are granites and quartzites ("whitestones") that form siliceous soils which are frequently lateritic and may form areas of mallee, thicket and scrub heath within the mosaic. Small salt lakes and some remaining fresh are frequently surrounded by a fringe of *Melaleuca* spp. and *Acacia* spp. The salt lakes may include samphire vegetation.

7. BOTANICAL HISTORY OF THE NARROGIN DISTRICT

The foundation of the Swan River Colony occurred in 1829. The first entry of Europeans into the Narrogin District may have been made by an exploring party led by Ensign R. Dale in 1830. This expedition travelled about 80 kilometres eastwards from York.

In November 1836 Surveyor General John Septimus Roe led an expedition "over the hills" to York then out into the unknown country to the east. This expedition eastwards was to the present site of Merredin. It is possible that Roe travelled through part of the Narrogin District in this early expedition. The discoveries were at the time a bitter disappointment to the new colony, as grass and running streams were needed for the flocks and herds of new settlers to the colony.

Dr Ludwig Priess a German naturalist, spent four years from 1838 studying and collecting plants. On two of his expeditions he made excursions into the Victoria District as far as the Quangan plains where he discovered many new species of plants and explored the Avon Valley along the York Road.

Another early settler James Drummond, became Government Naturalist to the colony. He was a Garden Inspector in Cork, Ireland before emigrating to the colony in the "*Parmelia*" in 1829 and as such was in a position to make extensive studies of the flora in the colony. During his first ten years in Australia he lived

on what he could produce on land taken up near Toodyay and by the sale of botanical specimens he collected near Perth and the Swan and Canning River watersheds.

Drummond worked with, or for, Sir W. J. Hooker, Charles Darwin, Baron von Hugel and Ludwig Priess. In the Narrogin District specific mention is made of collections from the country east of Narrogin and Quairading. The W.A. Herbarium records Drummond collecting the earliest Herbarium samples for the District in 1845- 1849. His discoveries were of great value and his name is attached to more than 100 species and plants endemic to Western Australia. He was described by his contemporary Archdeacon Wollaston as "an eminent and most indefatigable man. There is scarcely a conservatory of any note that is not indebted to him for some of its most curious and beautiful species. He makes nothing of walking 100 miles loaded with a knapsack."

After Drummond and his contemporaries, botanical exploration of the colony came under the influence of Ferdinand Von Mueller. He was the Government Botanist of Victoria from 1852 until his death in 1896. His whole life was devoted to the study of Australian botany. He was enthusiastic and was able to stimulate others with this enthusiasm. Many local settlers at the time collected for Mueller, for example, Mr Cronin who collected from Wagin Lake eastwards to Lake Lefroy and Miss Eaton from Youndeggin near Quairading. From these and other collections made by several expeditions to the inland of W.A., Mueller extracted much knowledge which he was to contribute to "*Flora Australiensis*."

In 1869, John Forrest was engaged on road surveys in the Avon District. He was noted for collecting plant specimens on his journeys and possibly collected in the western portion of the District, when surveying the York to Williams Road.

Marmaduke Terry an architect and surveyor, arrived in W.A. in 1896 and surveyed and classified a large area of land between Bridgetown, the Great Southern Railway and Albany, as well as work in the wheatbelt.

By the close of the nineteenth century, the grand period of descriptive botany for the State had almost closed as Britain and Europe paid less attention to Australian botany.

The last highlight of past history occurred at the commencement of the present century when in 1900 two German botanists, Dr L. Diels and Dr E. Pritzel, arrived in Western Australia. Their task was to describe the pattern of vegetation in relation to its environment. They collected extensively and described 235 species, summarising their work in 1904-1905 in "*Fragmenta Phytographiae Australiae Occidentalis*", an illustrated book and major authority on Western Australian flora. Diels and Pritzel travelled largely by train, making excursions from the railway, including one train journey along the Great Southern Railway, through Narrogin. In more remote areas they accompanied plant collectors on expeditions for von Mueller.

Plant specimens now stored in the W.A. Herbarium from early collectors during the period 1845 to 1909 from Narrogin District include, J Drummond (1845), P.G Wilson (1865), Miss Eaton (1889), W.E. Blackall (1897), A. E. Lankester (1897), M. Leake (1897-1901), R.B. Leake (1891-1897), M. Cronin (1893), Diels & Pritzel (1901), W.V. Fitzgerald (1901-1908), F.H. Vachell (1903), Dr A. Morrison (1903-1904), C. Andrews (1903 - 1908), F.H. Vachell (1903), M. Koch (1904) and J. H. Maiden (1909).

Charles Gardner in his position as government Botanist and Curator of the State Herbarium travelled and collected widely throughout the state over the period 1929 - 1961. He described many new species and prepared numerous books and papers on the vegetation of the State. The development of the railway at this time was an important factor in determining where early twentieth century collections were made. Gardner used the establishing railway system to traverse the Narrogin District, when collecting samples. From selected siding destinations he would then either proceed on by walking or hire a vehicle from a friendly farmer. He is noted for his collections in the Bendering area, and the only collection made in 1929 of *Thomasia gardneri* near Mount Holland.

The amateur Botanist William Blackall, who developed the "*Blackall Key*" accompanied Gardner on a number of expeditions, including into the Narrogin District.

In 1964 a project to systematically map the vegetation of the state was undertaken by John Beard. He defined distinct regions on the basis of landscape and vegetation. On the basis of this work, Beard revised the boundaries of the Botanical Regions of the South Western Botanical Province.

More recently, detailed vegetation surveys on crown reserved land, funded from the State and Commonwealth Governments have occurred. These surveys include *Some Nature Reserves of the Western Australian Wheatbelt* by B. G. Muir in 1978 -79, and *Vegetation and Flora of the Emu Rock, Hyden area* by K. R. Newby in 1981. A. Coates and A. Napier contributed by surveying the specific flora and vegetation of a number of selected reserves within the District. Extensive flora and vegetation surveys also occurred in the Boyagin and Tutanning Nature Reserves. In addition, a number of specific surveys for Declared Rare Flora were undertaken in the early to mid 1980's by Ms Sue Patrick. The Underground Orchid was extensively surveyed by K.W. Dixon in 1983, using volunteers from the Western Australian Native Orchid Study and Conservation Group.

Specific project orientated flora surveys have become the priority in recent times. For example, some surveys include, *Vegetation and Rare Flora assessment of the proposed Telecom Site on the summit of Middle Ironcap*, prepared for Telecom by F.H. Mollemans, and *Kondinin to Bounty Mine and Forrestiana Transmission Line Route*. Biological survey for SECWA, Dames and Moore (1992).

In 1992, CALM undertook a revision of Declared Rare and Priority Flora occurring within the District. Mr R. Buehrig as part of this revision made extensive surveys within the District in an attempt to relocate many of the old collection sites for these species. In addition, in his attempts other new collection sites were located.

Botanists including Ian Brooker, Andrew Brown, Bruce Maslin, Steve Hopper, Bob Chinnock and Paul Wilson have also carried out recent taxonomic studies on a range of plant genera found within the District.

Many other people too numerous to mention, including professional and amateur botanists, CALM flora volunteers, amateur naturalists and the general public have all made valuable contributions to the 15 900 flora collections from the Narrogin District stored in the Western Australian Herbarium.

8. USING GEOLOGICAL INFORMATION AS A TOOL FOR THREATENED FLORA SURVEYS

Geologists presume that geology and climate exert a strong control over soils and vegetation (Explanatory Notes for Perth (1978), Pinjarra (1980), Collie (1982), Hyden (1984), Lake Johnston (1979) & Boorabbin (1991)). Geologists, as a first step in preparing geology plans, use vegetation colour, texture and its presence or absence, to demarcate geologic units on aerial photographs. By definition therefore, geology, depicted on maps, represents certain vegetation associations in the field.

The Key to Geologic Units on the Geology Plan (Geological Survey of Western Australia, 1984, 1986) shows how closely they resemble plant habitats. Listed, with their geologic abbreviations bracketed, they describe unweathered material such as granite outcrops, or dolerite dykes, undisturbed but weathered products of these rocks, laterite, reworked sandplain derived from laterite, colluvium and alluvium derived from all the above, lake deposits and dunes swept up from lakes and drainage. Although the surface expression of these habitats is frequently unclear, seen or unseen, a simple and logical geologic continuum exists.

Beard understood well the relationship of plants to geology, soils and position in the topography (Beard 1980).

In surveying the Priority 1 and 2 species covered in this Management Program, we hypothesise that plants have a relationship to geologic units and therefore make predictions using geology where certain threatened plants may be located in the District. We particularly focus on conservation reserves, each of which has been categorised according to its geologic structure. From this, computerised data will forecast the possible threatened species that may inhabit specific conservation reserves. The program named "Prospect" forms a 47 page report of possible species location predictions that may be used in conjunction with this Management Program.

PART TWO: DECLARED RARE FLORA IN THE NARROGIN DISTRICT

In March 1996, thirty taxa of Declared Rare Flora were known to be extant within the Narrogin District. A further two species listed as presumed extinct on the Declared Rare Flora Schedule are also included in this Management Program. These are:

- *Leucopogon marginatus* : thought to have been re-located however, requires confirmation.
- *Thomasia gardneri*: collected once from near Mount Holland.

A brief description of the morphology, distribution and habitat specific to the Narrogin District for each taxon is supplied, to assist in the identification and location of additional populations. Photographs and line drawings may be accessed through the reference section to locate the original published description of the species.

The impact of certain management techniques (fire, mechanical disturbance, weed invasion, disease etc) is noted with recommendations for populations occurring in the Narrogin District to ensure their continued survival. Also provided are research recommendations, including further surveys, monitoring frequency, and research studies on life cycles.

Descriptions of the species were based on the original taxonomic descriptions. When descriptions were not available, reference is made to specialist taxonomists who provided a brief description. Distribution and habitat data for populations occurring in the District were compiled from Departmental files. Herbarium records were used in an attempt to provide details for the possible location of populations from old collection records.

The conservation status of the species and future status recommendations were determined from field observations and population records on Departmental files.

The population summary lists the number and condition of Declared Rare Flora populations within the District only, providing an indication on the population condition. These population details are accurate to April 1994. The precise locality details for all populations are contained on confidential Departmental files.

The impact of fire, soil disturbance, weed invasion and disease is also noted (where known) from observations made during field trips and from Departmental file records.

Reference is made to the effect of disturbance on the survival of certain species. There are two classes of rare flora, namely, those that are favoured by disturbance, and those to which disturbance is detrimental. The former are in the minority, and include, *Eremophila inflata*, *E. racemosa*, *E. verticillata*, *G. involucrata*, *G. scapigera* and *Lechenaultia pulvinaris*.

Eight Declared Rare Flora species are endemic to the Narrogin District. Of these two species are known from only one population. *Grevillea scapigera* is known from seven populations totalling only 43 plants.

Eighty seven percent of the Declared Rare Flora populations in the District occur within the extensively cleared agricultural region. Thirty populations occur on nature reserves, and four species are endemic to the Vacant Crown Land in the eastern portion of the District.

Seventeen species of Declared Rare Flora known from the Narrogin District have no populations occurring on nature reserves or other conservation reserves in the State.

Further surveys for most Declared Rare Flora species are still necessary. The aim of the surveys is to locate more individuals within populations and/or more populations. This section of the plan will assist in the development of surveys for the Declared Rare Flora known to occur in the District.

A small erect lignotuberos, densely crowded shrub to 1.5 metres high with erect branchlets and branches. The branchlets are cylindrical or almost so, with fine parallel grooves, and only 3 - 4 stem parts, the basal one being the shortest, the tip sharply pointed. Leaves are arranged in a circle consisting of four dry teeth united at the base encircling the stem at each node, the tips of the leaves regularly divided. There are separate male and female plants. Flowers are unisexual. Female flowers are clustered in stalkless, oval shaped cones on the older wood and hidden amongst the dense branches. The cones are covered with long coarse hair-like fibres. The fruit is a spherical woody cone about 10-20 mm long containing numerous seeds, each seed bearing a broad wing wider than the seed and each enclosed between two woody valves. The species is distinguished by the long fibrous hairs on its cones from which the species name refers. This species is related to *A. grevilleoides* and *A. microstachya*.

Flowering period: September and November.

Distribution and Habitat in the Narrogin District

A. fibrosa is confined to two populations in heath on white sand over laterite. It is restricted to an area from south of Tammin to west of Quairading, a range of 35 kilometres. W.A. Herbarium records indicate that it has occurred from a wider range, from west of Tammin to west of Quairading, a range of 60 kilometres. The population at the type locality, south-west of Tammin and a nearby population are now extinct.

Conservation Status

Current: Declared Rare Flora

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|--------------|-------------|-------|-------------|---------------|-------------|
| 2A Harrisons | 03/12/90 | Qua | PP | 150 | Good+fenced |
| 2B Nth of 2A | 03/12/90 | Qua | PP | 50 | Good+fenced |

Qua Shire of Quairading
* population known only as Herbarium record

Response to Disturbance

Following a fire, *A. fibrosa* regenerates from underground lignotubers and also releases seed. The last fire on the reserve south of Tammin was in 1966 and both sub populations were burnt.

Response to grazing, weed invasion and soil disturbance is unknown

Susceptibility to *Phytophthora* Dieback

Unknown.

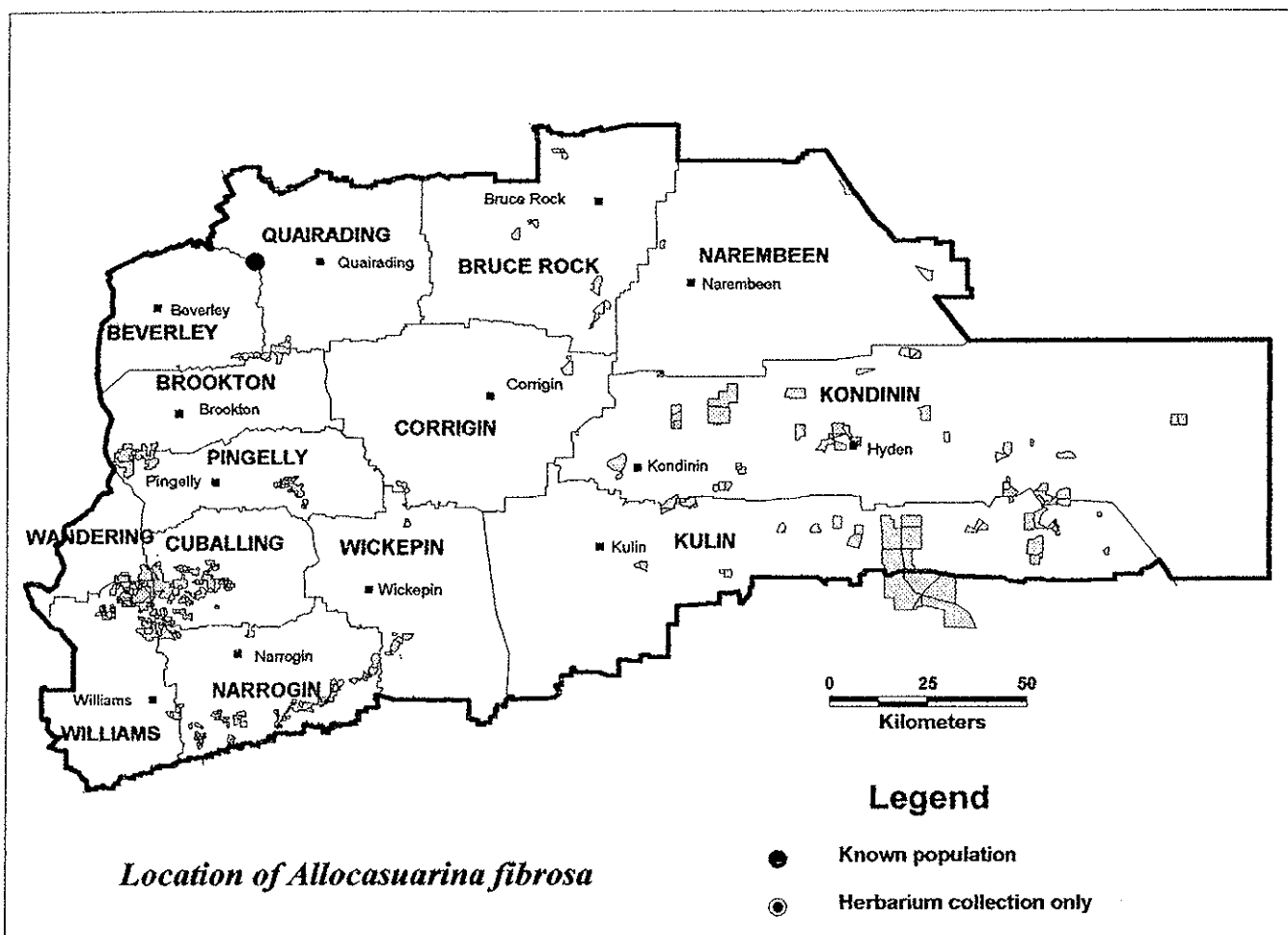
Management Requirements

Population number 2 should be inspected annually to check the security of the fence from accidental stock grazing and monitoring of plant numbers.

Research Requirements

- Further surveys of similar soil types and vegetation types associated with lateritic residuals and breakaways, should be undertaken to locate additional populations.
- Fire effects on regeneration and adult plant survival from lignotuberous shoots needs investigation.
- Germination trials may be considered to extend or establish new populations.
- Seed should be collected according to the protocols established by the Threatened Flora Seed Centre at the W.A. Herbarium.

References Gardner (1927), Lucas and Singe (1978), Leigh *et al* (1984), Atkins (1990).



Allocasuarina tortiramula E. Bennett.

CASUARINACEAE

Woolly Sheoak.

A dense-canopied shrub to 1.7 metres high, with spreading twisted branchlets up to 10 cm long, articles 6-10 mm long and 0.8-1 mm in diameter. The branchlet surface varies from smooth to covered with short hairs, giving a mixed green to blue-grey appearance. Cones are cylinder shaped, without a stalk. The cone body is 10-15mm long, and about 10 mm in diameter. The male flower clusters are 5-9 mm long. The species name refers to the twisted branchlets. Similar to *A. globosa*, but distinguished by the shorter articles, and fewer teeth, which are broader and thicker in texture.

Flowering Period: July to September.

Distribution and Habitat in the Narrogin District

The only plant recorded in the Narrogin District is located about 60 kilometres east of Pingaring. It is growing next to a cleared paddock on the edge of an extensive area of *Allocasuarina campestris* heath. The soil is a granitic clayey sand. It may be found associated with *Acacia lasiocalyx*, *A. campestris* and *Hakea petiolaris*.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|----------------|---|-------|-------------|---------------|-------------------------------|
| 2 Dragon Rocks | 11/92 | Kul | NR | 1 | Near fence + Private property |
| Kul | Shire of Kulin | | | | |
| * | population known only as Herbarium record | | | | |

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Not Known.

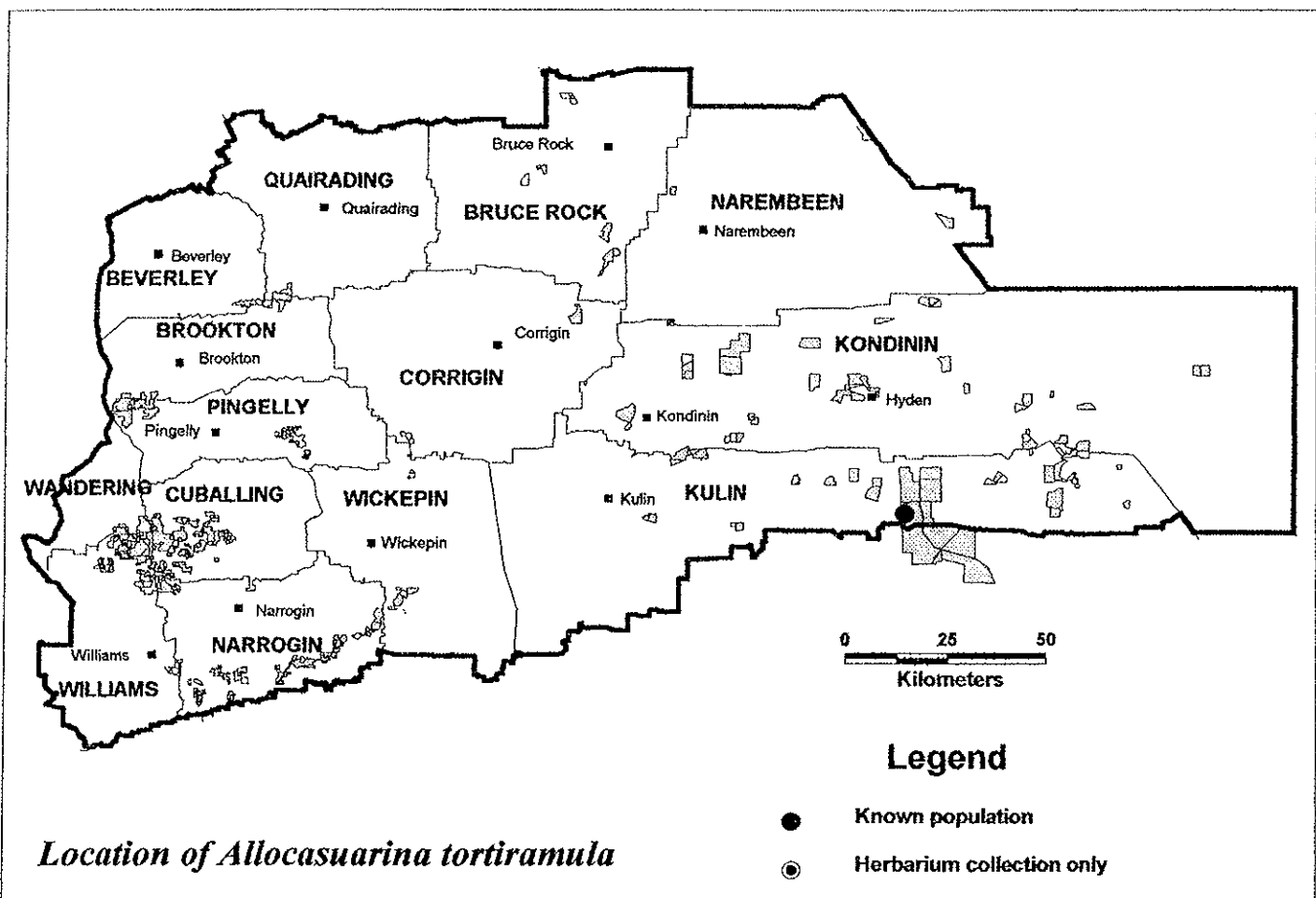
Management Requirements

- Notify adjoining landowner of population number 2 and protect from grazing.
- Markers are installed. Ensure protection during reserve maintenance operations.

Research Requirements

- Further surveys of similar vegetation associations near population number 2 are required to locate additional plants.
- The origin of this single plant may need further investigation to ascertain whether it is naturally occurring.
- Response to fire and susceptibility to other environmental impacts need further research.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References Bennett (1989), Hopper (1990).



Matchstick Banksia.

A dense-canopied shrub or small tree with smooth bark, to 4 metres high with one or several to many branched woody stems. The branches being erect, form an irregular and bushy crown. The leaves are 1-4 cm long and 0.5-1.5 cm wide and are generally flat, wedge shaped and strongly toothed. Inflorescences are 3-4 cm wide, and are found on the end of the branches. Flowers are cream, pink in colour, occurring towards the base, becoming pink throughout. The style is cream turning red with the pollen presenter green. There are usually 1 - 5 follicles in each fruiting cone. Follicles are 17-21 mm long and 9-12 mm wide and densely covered with short soft matted hairs. The species name refers to the wedge - shaped leaves.

Differs from *Banksia ilicifolia* R.Br. in the smooth bark, the smaller leaves, fruit, and the flowers being at first pink, then cream and finally reddish, with a green limb.

Flowering Period: September to December.

Distribution and Habitat in the Narrogin District

Found in low woodlands of *B. prionotes* (acorn banksia) and *Xylomelum angustifolium* (woody pear) on yellow sand in the Pingelly - Quairading area. Known from three shires in the central wheatbelt within a distribution range of about 90 kilometres. Typically, *B. cuneata* occurs on deep yellow sands (Quailing Depositional) at elevations of 235 - 300 metres.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|---------------------|-------------|-------|-------------|---------------|----------------------|
| 1 Quairading | 7/7/93 | Qua | RVM | 31 | Disturbed |
| 2 Quairading | 9/2/88 | Qua | NR | 13+ | Undisturbed |
| 3 Mears | 11/01/94 | Bro | RVS | 0 | Disturbed. All dead. |
| 4 Mears | 9/2/88 | Bro | WAR | 86 | Undisturbed |
| 5 Mears | 9/2/88 | Bro | RVS | 10 | Disturbed |
| 6 Quairading | 11/01/96 | Qua | TWS | 100 | Burnt |
| 7 Simpson | 9/2/88 | Qua | PP | 50 | Disturbed |
| 8 A,B+C Lazeaway | 16/7/92 | Cub | PP | 162 | P.c Infection |
| 9 Cuballing | 21/4/93 | Cub | RVS | 1 | Disturbed |
| 10 Johnston | 11/01/94 | Qua | PP | 9 | Disturbed |

Qua Shire of Quairading

Bro Shire of Brookton

Cub Shire of Cuballing

* population known only as Herbarium record

Response to Disturbance

Adult plants are killed by fire, new plants regenerating from seed. Part of population number 1 was burnt in a prescribed fire for regeneration in April 1987. All parent trees burnt were killed, regeneration of seedlings occurred following the fire however, mortality was high during summer with no surviving seedlings.

Wind erosion, salination, rabbits, and weeds potentially contribute to habitat degradation.

Recruitment of seedlings is affected by the vulnerability of seedlings to the summer drought.

Susceptibility to *Phytophthora Dieback*

Known to be susceptible. A confirmed infection of *P. cinnamomi* occurs at population 8C.

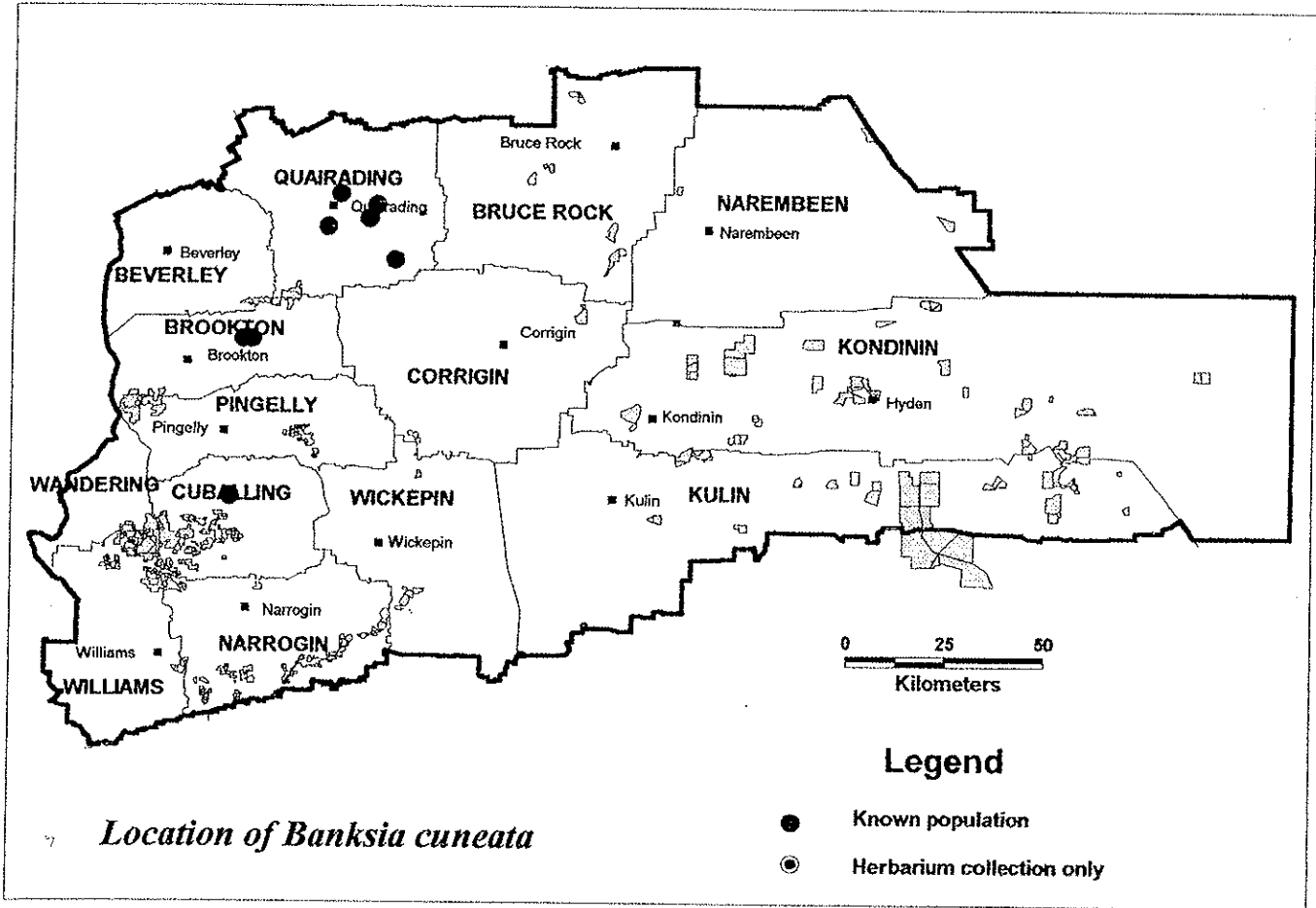
Management Requirements

- A recovery plan has been approved and funding is available to implement the plan. Implementation of recommendations for management as described in the "Recovery Plan for *Banksia cuneata* 1991" commenced in 1993/94.
- Reserve 12397 should be vested in the NPNCA as a Nature reserve.
- Part of the Quairading town site reserve should be vested in NPNCA.
- Monitoring of populations on an annual basis including soil sampling for *P. cinnamomi*.
- Population 8A,B+C should be treated with Phosphonate to control *P. cinnamomi* annually.
- Monitor *Armillaria* sp. at population number 8.

Research Requirements

- Implement recommendations for research as described in the recovery plan to protect existing natural sites and re-establish populations near existing sites on private property.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References George A.S.(1981), Patrick and Hopper (1982), Stace (1991).



Ironcap Banksia

A lignotuberous shrub or small tree 2-4 metre tall, with long and narrow, bluish green, toothless or lobeless leaves. The flowers are golden. The inflorescences are upright and spherical, opening from the apex down. The styles are hooked just below the apex. The fruiting cone is spherical with up to 60 follicles, often crowded and at first with spreading hairs which may wear off on exposed surfaces. The species name refers to the very long pistil.

Flowering Period: March to May.

Distribution and Habitat in the Narrogin District

Confined to an area east of the cleared wheatbelt within the Narrogin and Merredin Districts. It occurs in Vacant Crown Land north from Digger Rocks through Forrestania to Mount Holland, in the Merredin District. This species prefers iron - capped rises on ironstone profiles. It is found in low woodlands to low shrublands with associates which include *Dryandra* and *Allocasuarina* species.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|--------------------|-------------|-------|-------------|---------------|---------------------|
| 1A+B Sth Ironcap | 11/01/91 | Kon | VCL | 500 | Undisturbed |
| 3 Nth Ironcap | 04/04/91 | Kon | VCL | 100 | Undisturbed |
| 4A+B+C Forrestania | 16/09/93 | Kon | VCL & RVS | 150 | Undisturbed |
| 5 Forrestania | 18/03/94 | Kon | VCL | Nil | Burnt January 94 |
| 6A+B Sth Ironcap | 16/09/93 | Kon | VCL & RVS | 1200 | 14 plants disturbed |
| 10 Forrestania | ./03/92 | Kon | RVS | 1 | Unknown |
| 11 Forrestania | ./03/92 | Kon | VCL | >100 | Unknown |
| 12 Sth Ironcap | ./12/93 | Kon | VCL | 20 | Near seismic line |

Kon Shire of Kondinin
* population known only as Herbarium record

Response to Disturbance

Parent plants are fire tolerant, sprouting from a lignotuber. Regenerates from seed following fire however, repeated fires may affect population numbers.

Susceptibility to *Phytophthora* Dieback

Susceptible to *Phytophthora* sp. disease. Although there is no recorded infection the potential exists for the introduction of disease into populations.

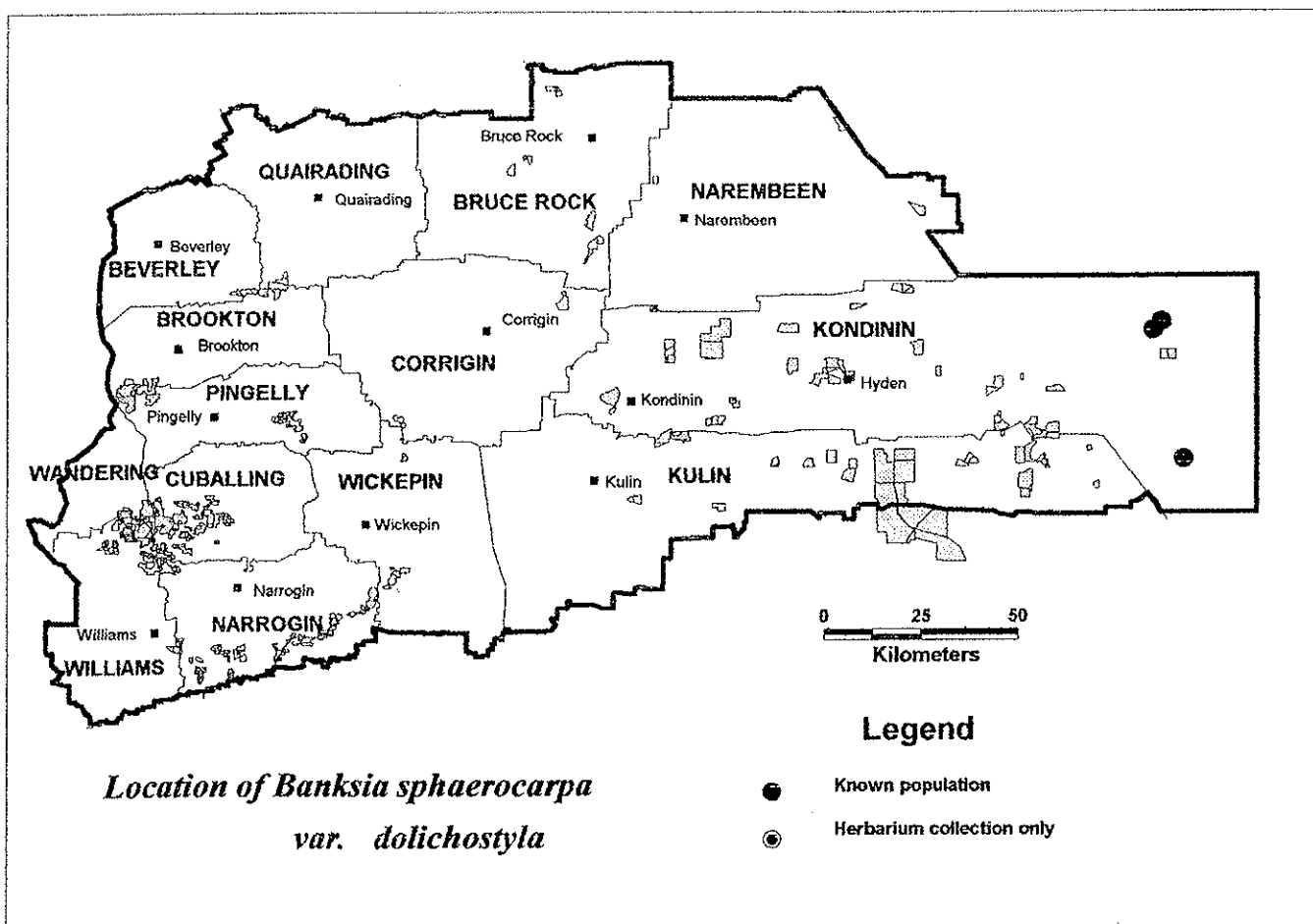
Management Requirements

- Reservation of some of the populations in conservation reserves is a matter of priority.
- All mining operations be planned to ensure populations are not disturbed.
- All roadside populations to be identified by roadside marker pegs.

Research Requirements

- Monitor populations at least every five years.
- Survey to locate new populations on ironstone formations not previously surveyed.
- Survey of population number 5 required to assess regrowth from lignotuber and seed following fire in January 1994.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A Herbarium.

References George (1981), Patrick and Hopper (1982), Taylor and Hopper (1988), Hopper *et al.* (1990), Dames and Moore (1992).



Ironcaps Boronia.

An upright hairy shrub to 1.5 metres tall with branches sparsely covered with long soft hairs. Leaves are crowded, divided into three leaflets where the edges of the leaflets are strongly rolled back towards the midrib. The leaflets are hairless on the upper surface and hairy below, and borne on short stalks 1.5 mm long. Flowers are pale pink, borne singularly in the leaf axils on hairless red peduncles which are top-shaped beneath the calyx. The four petals are egg shaped and have prominent midribs, 7 mm long and have pointed tips, and are loosely-hairy on the outside. The sepals are red, egg shaped with pointed tips and about 3 mm long. the fruit is a capsule containing four 1 seeded carpels. The seeds are kidney-shaped and 3.5 mm long. The species name refers to the margin of the leaf which is rolled back on itself.

Flowering Period: September to October.

Distribution and Habitat in the Narrogin District

Found on rocky and ironstone hills in the South Ironcap-Hatters Hill area east of Varley. It grows in scrub and heath associations. Found with *Eucalyptus* and *Allocasuarina* species. The plant appears to be restricted to habitats associated with ironstone. It grows well in exposed sheet ironstone, in cracks in the rock.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|---------------|-------------|-------|-------------|---------------|--|
| 2 Varley east | 15/09/93 | Kon | VCL | 400+ | Good. Subject to mining lease. |
| 3 Varley east | 15/09/93 | Kon | VCL | 0 | Reported to occur. Unable to locate in 1993. |

Kon- Shire of Kondinin
* population known only as Herbarium record

Response to Disturbance

All environmental impacts on this species are unknown. Most likely to germinate from seed following a fire or by physical disturbance.

Prefers open areas within bushland habitat.

Weed invasion should not be a concern given the surrounding vast bush area and habitat.

Susceptibility to *Phytophthora* Dieback

Not Known.

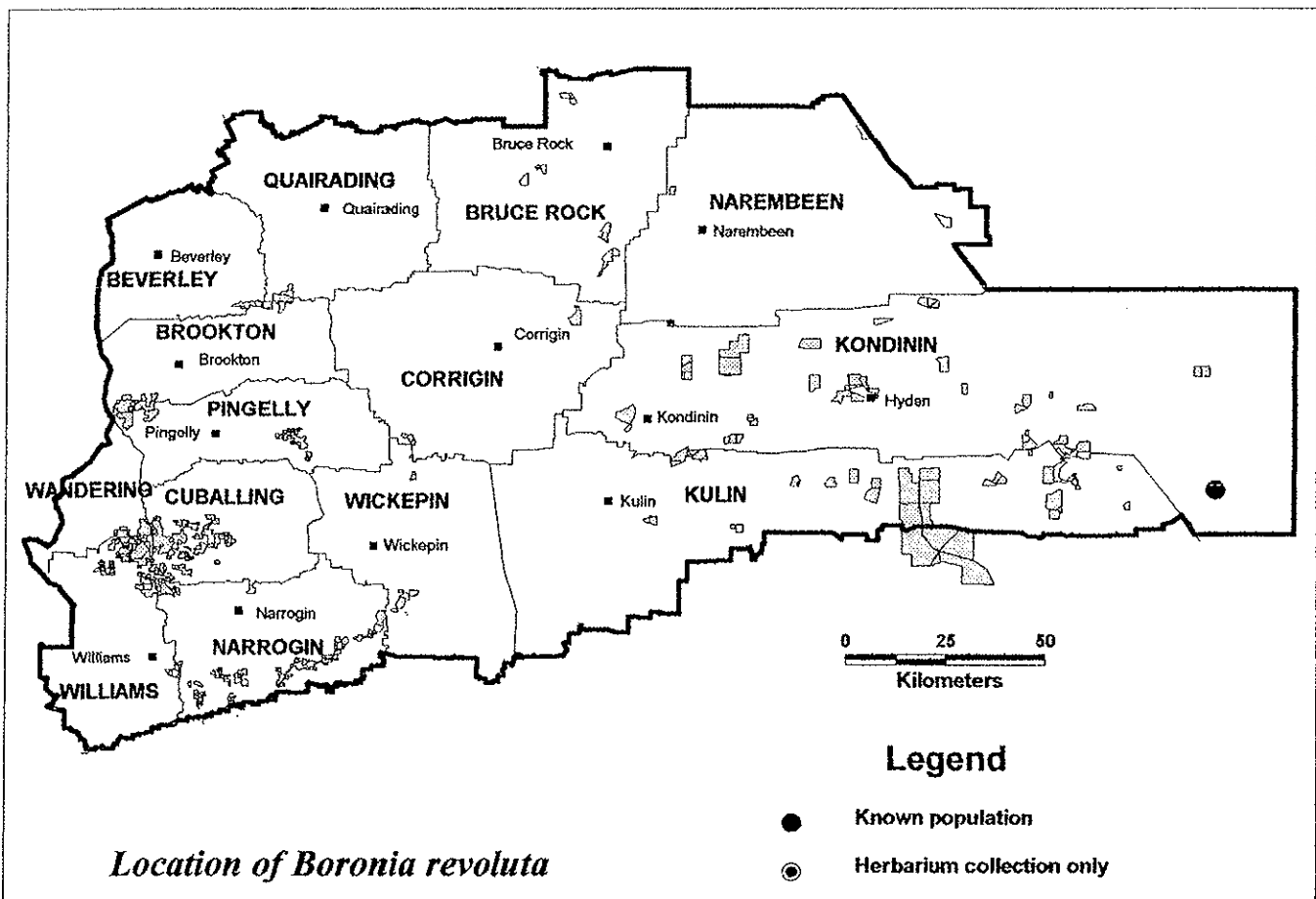
Management Requirements

- Reservation of populations into Nature Reserves is needed to ensure the long term protection of this species.
- Inspection of population number 2 required every two years during flowering period.
- Plants occurring near the main access track to population number 2 need protection by roadside markers. Other seismic lines within the population need blocking.

Research Requirements

- Surveys for new populations are required during the flowering period. It is unlikely population 3 is still extant however, opportunistic surveys at this located may be beneficial to confirm this.
- Germination trials should be undertaken at the Kings Park Botanic Gardens
- Susceptibility to fire, weeds and disease needs further investigation.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References Wilson P.G. (1971), Leigh J.(1984), Hopper *et al.* (1990).



Caladenia hoffmanii Hopper and A.P. Brown ms.

ORCHIDACEAE

Hoffman's Spider Orchid.

A tuberous "Spider orchid" to 30 cm tall, with sepals to 3 cm long, terminating in abbreviated glandular tails. The single leaf is, hairy, 8-15 cm long and 5-10 mm wide. the stem is hairy. There are 1-3 flowers per plant, that are 3-7 cm long and 3-5 cm wide, creamy-yellow with red markings. The labellum is red tipped and curled only at the tip.

Flowering Period: August to October.

Distribution and Habitat in the Narrogin District

In the Narrogin District, *C. hoffmanii* ms. grows in gritty sandy-clay soils on and near large granite outcrops in the Pingaring area. It is found associated with *Allocasuarina huegeliana*, *Leptospermum erubescens*, *Verticordia chrysantha* and other *Caladenia* sp.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|----------------|-------------|-------|-------------|---------------|---------------------------|
| 4 Pingaring | 15/09/94 | Kul | WAR | 1 | Needs survey of rock area |
| 6 Mc Cann Rock | 15/09/94 | Kon | VCL | 4 | Needs survey of rock area |

Kul Shire of Kulin

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

Response to environmental impacts is unknown, although may be affected by grazing by rabbits.

Susceptibility to *Phytophthora* Dieback

Not Known.

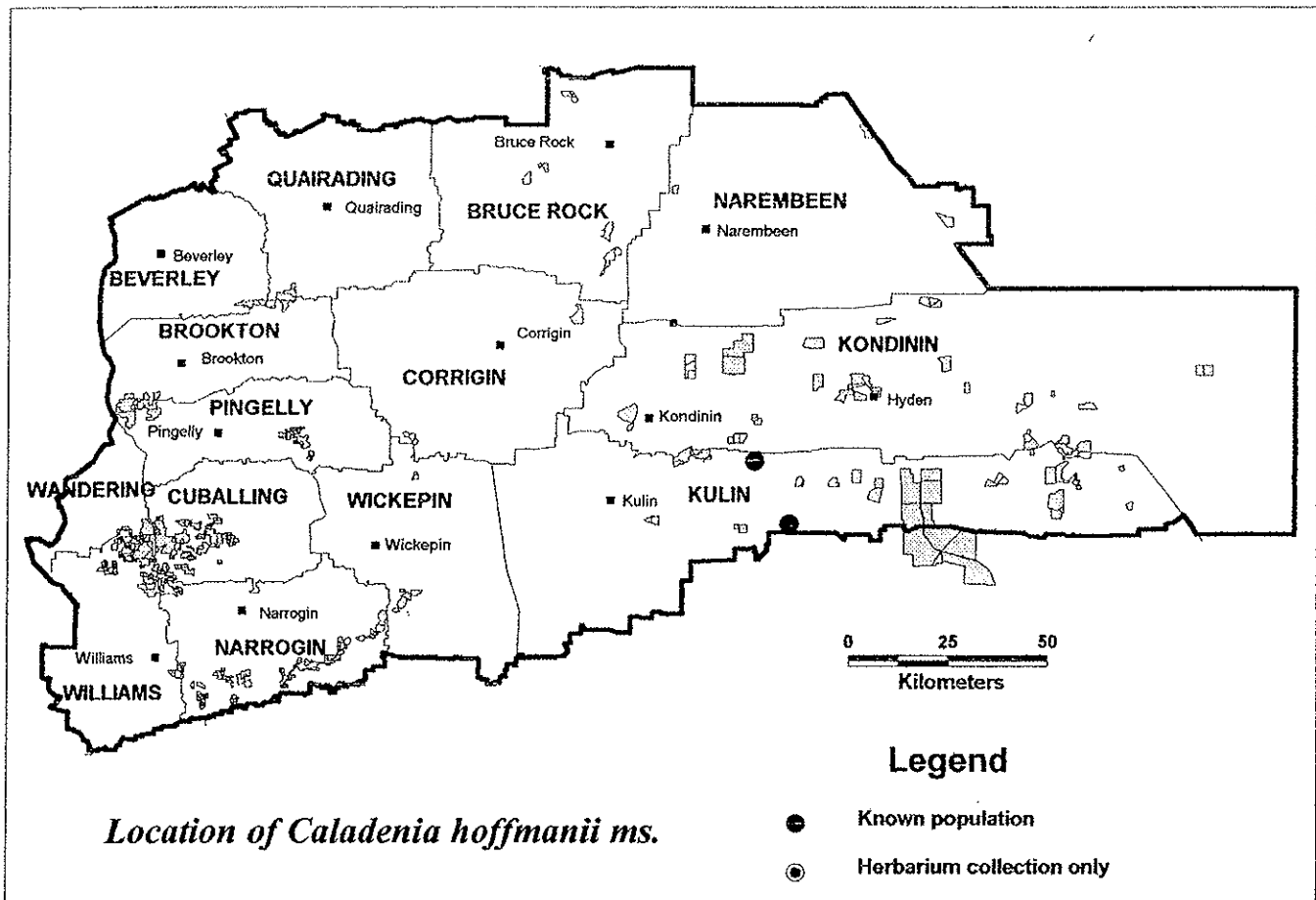
Management Requirements

- Investigate the possibility of the reserve containing population number 4 & 6 being vested as a Nature Reserve.
- Maintain the rabbit control programmes at population numbers 4 and 6.
- Protect populations from reserve management operations and recreational activities.

Research Requirements

- Re-survey populations number 4 and 6, map and record numbers of plants in the vicinity of the granite rocks during the flowering period.
- Survey for additional populations in similar sites within the species known range.
- Investigate responses to environmental factors.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References Hoffman and Brown A. (1992), Hopper *et al.* (1990).



Calectasia arnoldii K Dixon ms.

DASYPOGONACEAE

Stilted Tinsel Lily.

C. arnoldii ms. is closely related to the more common *C. grandiflora*. It is distinctive in its very erect growth, to 30 cm high, and numerous stilt roots, some projecting from upper branches into the soil. The flowers are deep blue-purple with the anthers aging red.

The generic name refers to the striking, star shaped perianth-lobes.

C. grandiflora re-sprouts from a rootstock following a fire, *C. arnoldii* ms. reproduces by seed following fire.

Flowering Period: August to October.

Distribution and Habitat in the Narrogin District

A species of scattered distribution over a range of about 400 kilometres, from near Coorow in the Moora District to the Dragon Rocks area in the Katanning District.

In the Narrogin District, this species is recorded from Quairading to Dragon Rocks, occurring in heath-shrubland communities growing on white-yellow sand over laterite, in association with a wide range of species that include *Melaleuca scabra*, *Actinostrobos* sp, *Banksia violacea* and *Leptospermum* sp. May also occur with *Calectasia grandiflora*.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|----------------------|-------------|-------|-------------|---------------|---------------------------|
| 1 Quairading | 15/02/94 | Qua | TWS | 40+ | Showing drought stress. |
| 4 Dragon Rocks | 1991 | Kul | NR | ? | Within middle of reserve. |
| 5 Dongolocking | 25/09/93 | Wic | NR | 20 | Undisturbed. |
| 8A,B,C,D Toolibin | 30/09/93 | Wic | TWS | 11 | Scattered plants |
| 9 Tarwonga | 09/08/93 | Nar | PP | 22 | Undisturbed. |

| | |
|-----|---|
| Qua | Shire of Quairading |
| Kul | Shire of Kulin |
| Wic | Shire of Wickepin |
| Nar | Shire of Narrogin |
| * | population known only as Herbarium record |

Response to Disturbance

Species is fire sensitive. Germinates from seed following fire rather than re-sprouting from a rootstock.

Other environmental impacts are unknown, however may be susceptible to weed invasion and grazing by domestic and feral animals.

Burrowing rabbits may disturb sandy sites.

Susceptibility to *Phytophthora* Dieback

Not Known.

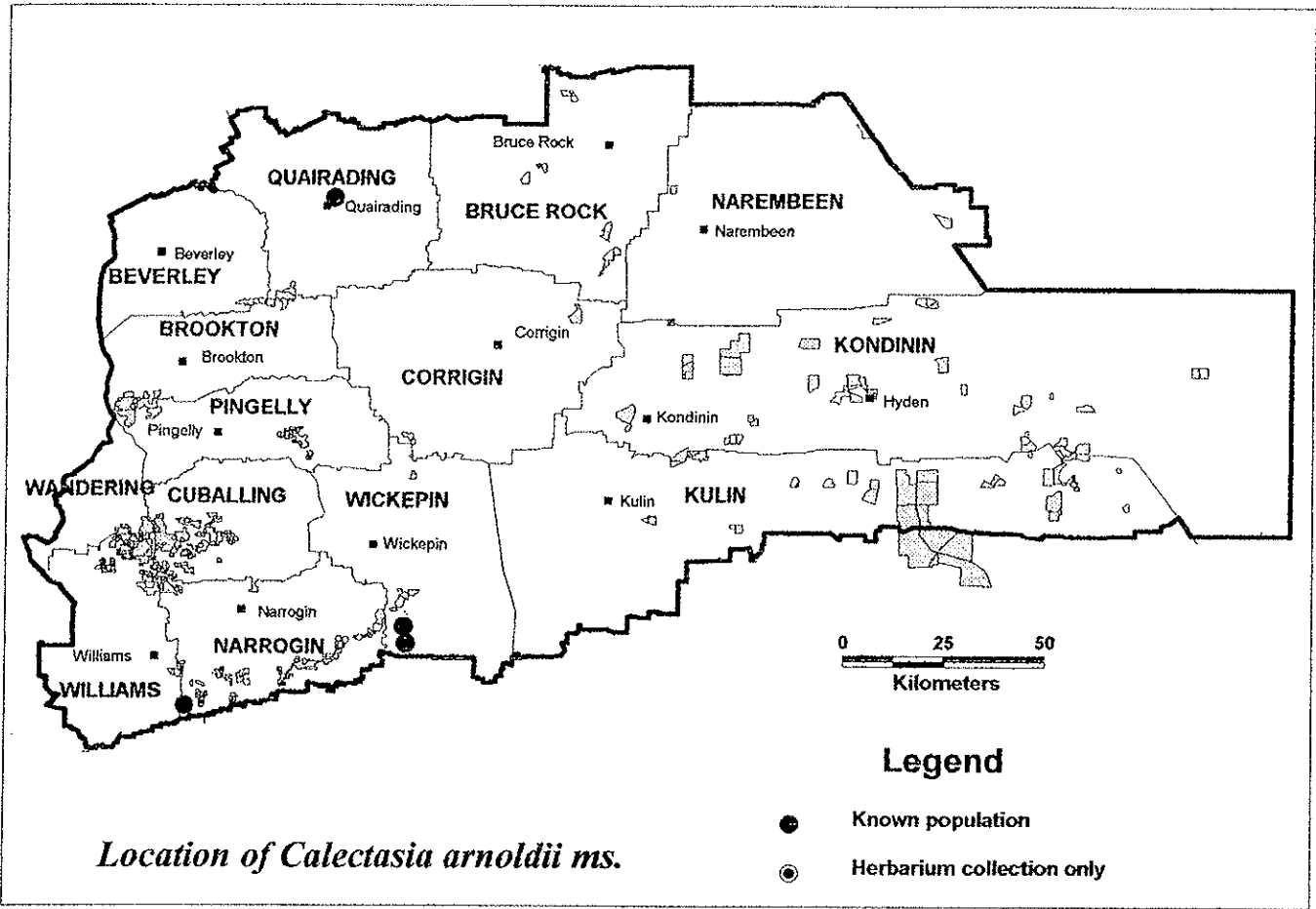
Management Requirements

- Protect sites within conservation reserves from fire.
- Inspect population number 9 and have site protected from domestic stock.
- Have land associated with population number 1 vested as a nature reserve.

Research Requirements

- Survey for additional populations on conservation reserves and provide recommendation for future protection status.
- Monitor population sites at least every 5 years.
- Investigate the effect and response of fire on the species survival.
- Determine the life history.
- Establish in cultivation at Kings Park and Botanic Gardens.

References K. Dixon (Personal communication).



Kulin Conostylis.

A tufted herb with flat green leaves to 2.5-5 cm long and 0.6-1.5 mm wide. The leaves are hairless, except for marginal hairs spreading in two alternate ranks on each leaf margin. The hairs are 1-3.5 mm long, white, woolly, simple but minutely spiny. The flowers are solitary, up to 15 mm long, having all six stamens at the same level in the perianth. The flower is held on a leafless, 0.5-2.5 cm long flower stalk. The perianth is 10-12.5 mm long, with feather like hairs, pale yellow and lobes 5-7.5 mm long. Stamens are arranged at one level in the perianth, the anthers 3-4.5 mm long, the style is 5-10 mm long. The placenta is shield shaped, with a few hanging ovules. Flowers are yellow in colour.

Flowering Period: September.

Distribution and Habitat in the Narrogin District

Occurs in sandy heath areas, on rises in sand over laterite in low heath with scattered mallee. Occurs with species that include *Dryandra ferrugina*, *Banksia sphaerocarpa*, *B. violacea*, *Allocasuarina humilis* and *Eremaea pauciflora*.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|------------|-------------|-------|-------------|---------------|-----------------------------------|
| 1A,B+C | 17/01/90 | Kul | NR | 200 | Good. Previous sand mining nearby |

Kul Shire of Kulin
* population known only as Herbarium record

Response to Disturbance

Relationship to environmental impacts such as fire, disturbance, and disease are unknown.

May be affected by weed invasion for establishment and growth. Sandy sites where *C. rogeri* occurs, may be affected by rabbits digging warrens, grazing, and other disturbance.

Susceptibility to *Phytophthora* Dieback

Not Known.

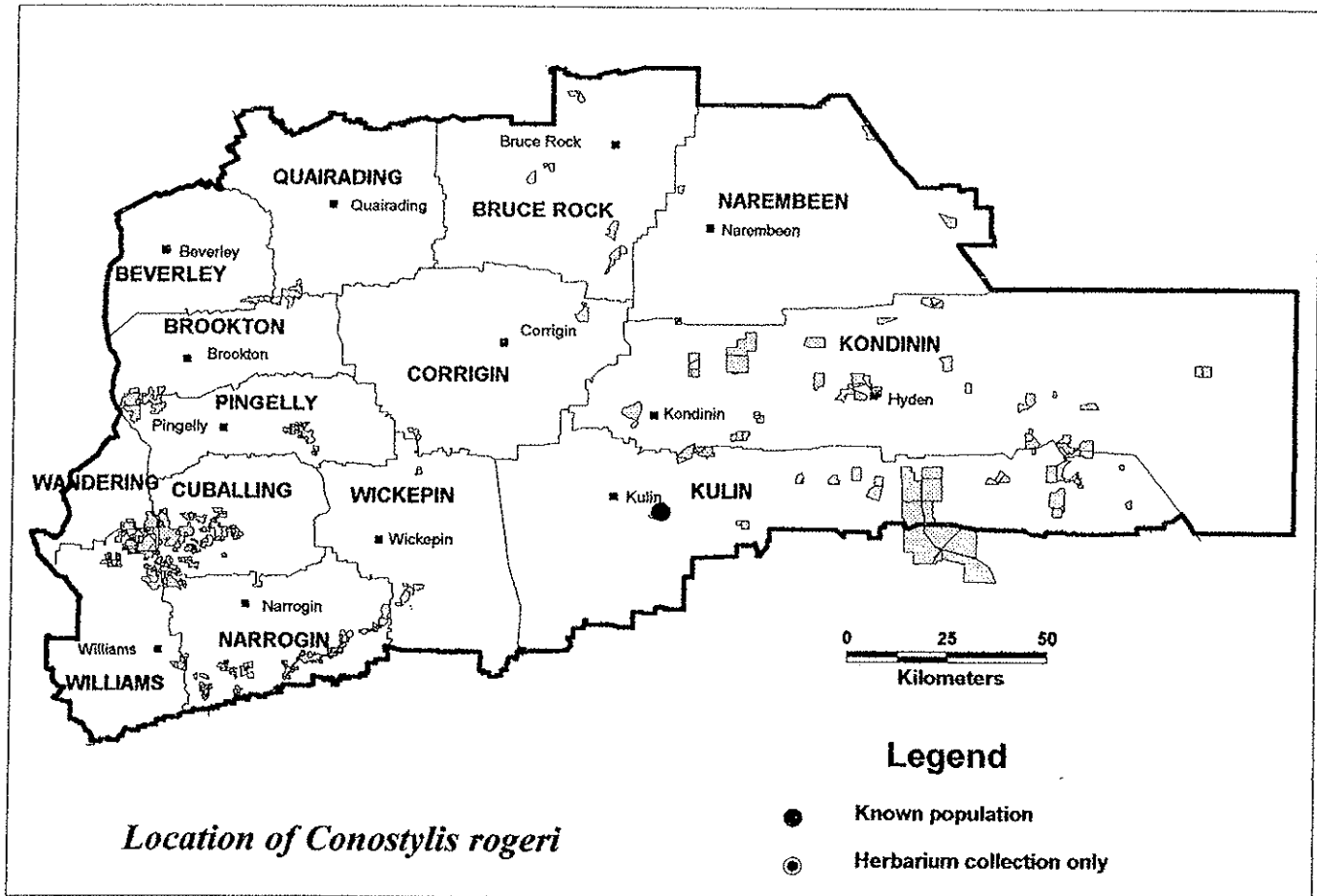
Management Requirements

- During the flowering period accurately survey and map population number 1 for future monitoring.
- Monitor population occasionally.
- Control of rabbits and careful destruction of warrens is needed in adjoining bush.
- The rehabilitation of the nearby sand pit on the northern boundary is required.
- Ensure population is protected during reserve management operations.

Research Requirements

- Survey of additional populations within similar soil types is needed on adjacent nature reserves.
- Investigate effects of fire on survival and establishment.
- Research into life cycle of the species, studying survival mechanisms for the long term management of this species.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References Hopper (1987), Hopper *et al.* (1990).



Conostylis seorsiflora subsp. *trichophylla* S.D. Hopper. **HAEMODORACEAE**

Hairy Mat Conostylis.

A prostrate, tufted, 3-4 cm in diameter mat-forming herb. The plant branches and spreads by connected underground and aerial stems in a network up to 40 cm across. The leaves are narrow linear, flat, silvery-grey, densely hairy leaves when young and when fully grown, 2-8 cm long. Stems are 2-6 cm long. Flowers are solitary, held on a leafless stalk, 0.1-5.2 cm long, usually with a middle leafy, hairless bract 7-18 mm long and two linear bracts underneath the flower. The perianth is 12-15 mm long, tubular, yellow in colour, hairy on the outside with branched hairs less than 1 mm long, loosely hairy on the inside. 8-10.5 mm long lobes number six and are narrow lanceolate. The stamens are erect on short stalks. The anthers are 4-5.5 mm long, projecting beyond the flower lobes. The style is 7.5-10.5 mm long almost equal to the stamens. The pedicels are 1-3 mm long. The species name refers to the solitary flowers and the densely hairy leaves. The proliferous habit and solitary flowers distinguish the species, while the sub species is distinguished by the hairy leaves, giving the plant a silvery grey appearance.

Flowering Period: October to November.

Distribution and Habitat in the Narrogin District

Known only from one population in the Narrogin District, 12 kilometres south - south east of Tincurrin on a road verge and private property. A small population occurs in the Katanning District. Grows in winter wet, seepage areas of yellow brown sandy loam beneath *Eucalyptus wandoo* woodland. Associated species include *Calothamnus quadrifidus*, *Allocasuarina huegeliana*, *Loxocarya* sp. and *Leptospermum* sp.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|------------|-------------|-------|-------------|---------------|-------------|
| 1A+B Ward | 18/10/94 | Wic | PP+RVS | 1000+ | Undisturbed |

Wic Shire of Wickepin
* population known only as Herbarium record

Response to Disturbance

Response to environmental impacts is unknown.

Susceptibility to *Phytophthora* Dieback

Not Known.

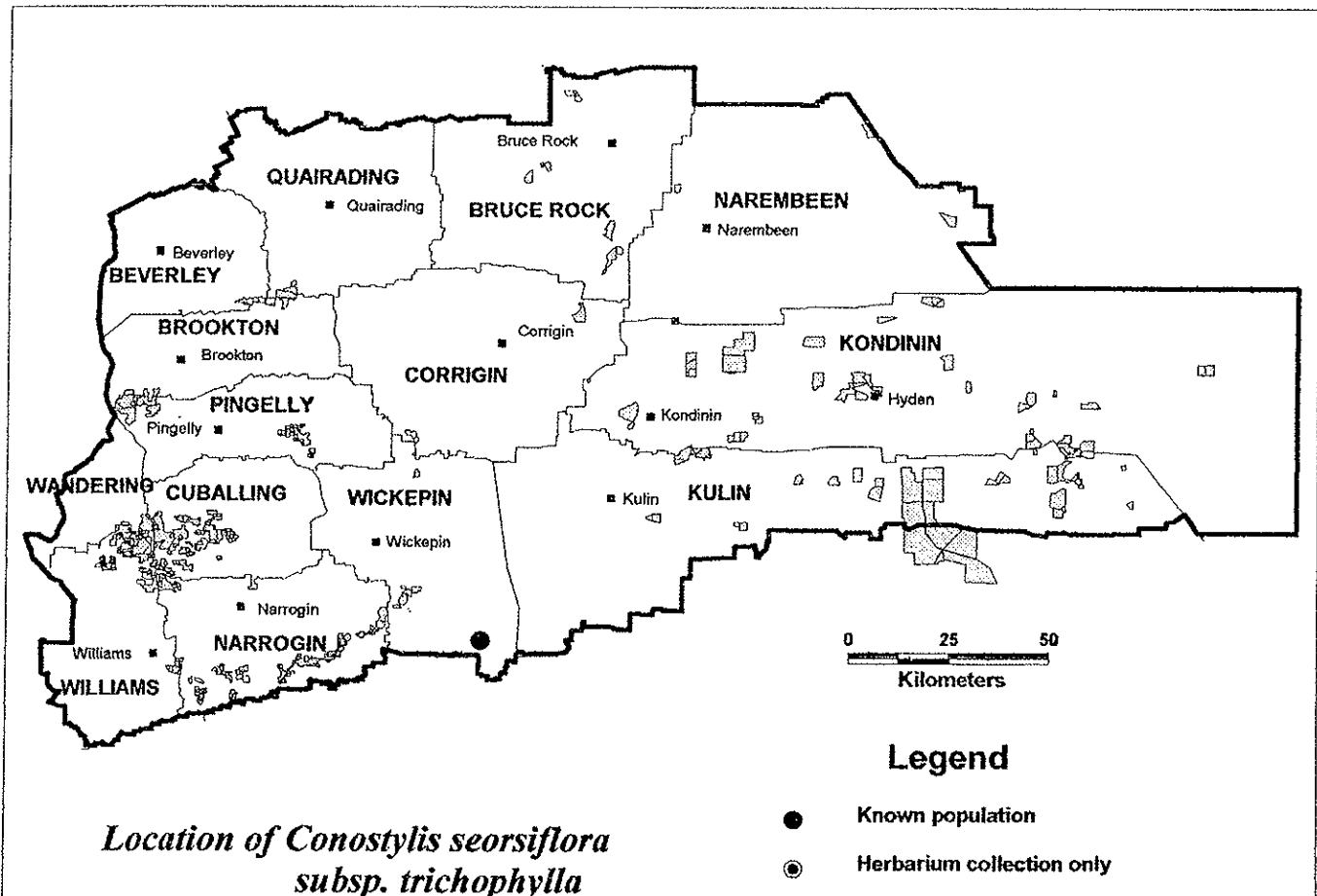
Management Requirements

- Survey population number 1 during the flowering period on an annual basis to monitor the population.
- regularly check the condition of the fence surrounding population number 1B.
- Relocate the existing fence on the northern side to protect additional plants presently outside the fenced area.
- Monitor rabbit numbers and control as necessary.
- Control veldt grass incursion using herbicide.

Research Requirements

- Survey for additional populations on conservation reserves on similar sites within the species known range.
- Investigate the environmental impacts for long term survival.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References Hopper (1987), Hopper *et al.* (1990), and Patrick (1983).



Mogumber Bell

An erect open shrub up to 40 cm tall. Leaves occur in opposite pairs, folded down the centre, acutely pointed, up to 1.5 cm long and 0.4 cm wide when flattened. The bell up to 3 cm long bracts are paired, and multi - coloured with flesh, green and pinkish tints. Flower clusters occur on the end of the branchlets, drooping, with approximately 10 - 14 flowers. Styles are 1.5 - 2 cm long, hairy below the stigma, not protruding beyond the surrounding bracts. The species name refers to the unusual colour of its bells. The Mogumber Bell does not seem to have any close relatives and can be distinguished from other *Darwinia* species both by its leaves and by the unique colour and shape of its bells.

Flowering Period: October to December.

Distribution and Habitat in the Narrogin District

Within the Narrogin District this species is confined to a single small population growing on an exposed laterite hill top on private property near Narrogin. It may be found associated with scrubland to 2.5 metre tall on low hills consisting of very shallow soil or gravel over laterite cap rock. Associated species include *Dryandra nobilis* and *Adenanthos cygnorum*, *Banksia sphaerocarpa*, and *Beaufortia incana*.

Also found near Mogumber, but this may be determined to be a different taxon.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|------------|-------------|-------|-------------|---------------|-------------------------------|
| 1 Narrogin | 09/02/94 | Nar | PP | 98 | Vulnerable. 72 new seedlings. |

Nar Shire of Narrogin
* population known only as Herbarium record

Response to Disturbance

Plants probably susceptible to fire, and rely on seed to germinate. Germination appears to occur on slightly disturbed sites within the population where soil has been exposed or loosened. Seed viability seems to be low from germination trials carried out at Kings Park. Major rainfall events in summer and autumn increase seedling numbers in the following year. Seedlings and mature plants are affected by grazing of sheep and rabbits. Weeds may inhibit germination of seedlings.

Susceptibility to *Phytophthora* Dieback

Susceptible to *Phytophthora cinnamomi*.

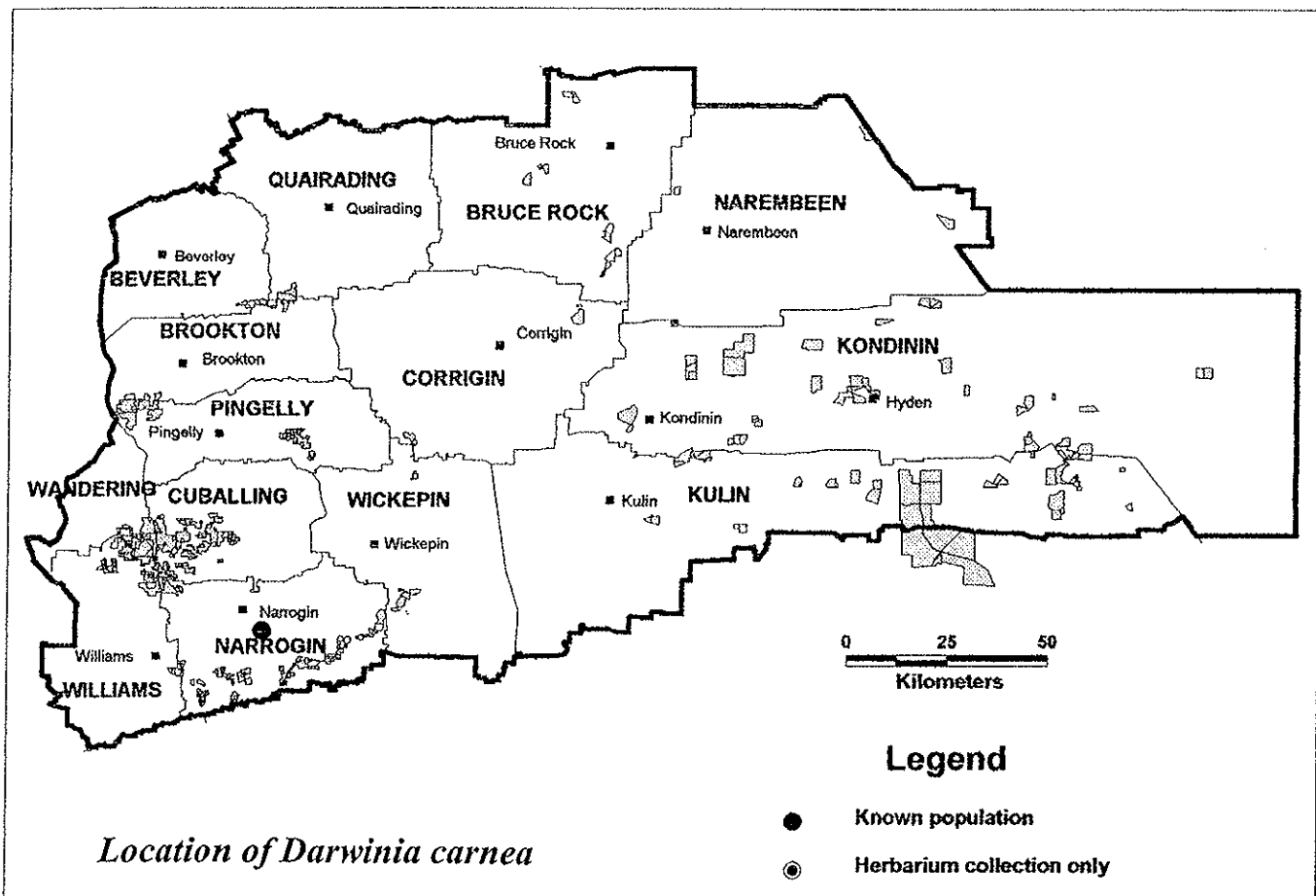
Management Requirements

- Complete Interim Recovery Plan and implement the enhancement of existing populations and establish additional new populations in the wild.
- Renew rabbit netting at population number 1.
- Control rabbit populations around the site in conjunction with landowner.
- Maintain cutting material from all existing populations in storage or cultivation at the Kings Park Botanic gardens.
- Monitor population number 1 at least annually during November and maintain records of mature plant and seedling numbers and health.

Research Requirements

- Survey opportunistically. Extensive surveys within the vicinity of population number 1 on similar sites occurred in 1990 with no success. Little would be gained by further intensive survey work.
- The effect of smoke on the germination of seed should be investigated by Kings Park Botanic Garden .
- Collect seed and cuttings for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References Erickson (1971), Rye.(1982), Marchant and Keighery (Undated).



Eremophila caerulea (S .Moore) Diels
subsp. *merrallii* R Chinnock.

MYOPORACEAE

Bruce Rock Eremophila.

A shrub to 0.8 metres tall and 0.5 metres wide. The leaves are 6-10 mm in length, the flowers are without a stalk and occur in the axil of the leaf, towards the end of the branches. The calyx segments are almost linear, 5 mm in length and densely hairy. The 1 cm long corolla is blue, purple or violet, dark blotched, narrowed toward the base. It is sparsely hairy on the outside with acute lateral lobes and small equilateral triangular shaped upper lobes. The stamens are shorter than the corolla and the style is nearly hairless. Fruits egg shaped 2 mm x 3 mm rarely containing a seed. The species name refers to the deep blue colour of the corolla.

The species is entomophilous with wasps, small bees and moths feeding on the plants.

This plant is closely related to *E. caerulea* from the Coolgardie area but can be distinguished by its leaves, which are cylindrical and slightly tapering, thick and warty with a knobby appearance, and which are densely covered with star shaped hairs, and by its sprawling habit.

Flowering Period: August to January

Distribution and Habitat in the Narrogin District

Known from one roadside population in the Narrogin District in the Shire of Bruce Rock. It occurs in open shrub mallee on light coloured stony clay-loam soils. Other populations are also known from near Jaurdie Station, north-east of Southern Cross.

Conservation Status

Current: Declared Rare Flora[#]

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|------------|--|-------|-------------|---------------|---|
| 1A+B | 23/09/93 | Bru | RVS+PP | 15 | Plants vulnerable from roadside disturbance and underground pipeline. |
| Bru * | Shire of Bruce Rock population known only as Herbarium record | | | | |

[#] now Priority 4 (updated at December 1999)

Response to Disturbance

Known to sucker when the roots are disturbed. Physical site disturbance remains a threat especially to the roadside population at Bruce Rock. Weed invasion may effect the long term survival of the population. Movement of stock along the road near population number 1 may also be a threat.

Other disturbance threats to population number 1 include exposure to fertiliser and chemical drift, exhaust fumes and wind.

Susceptibility to *Phytophthora* Dieback

Not Known.

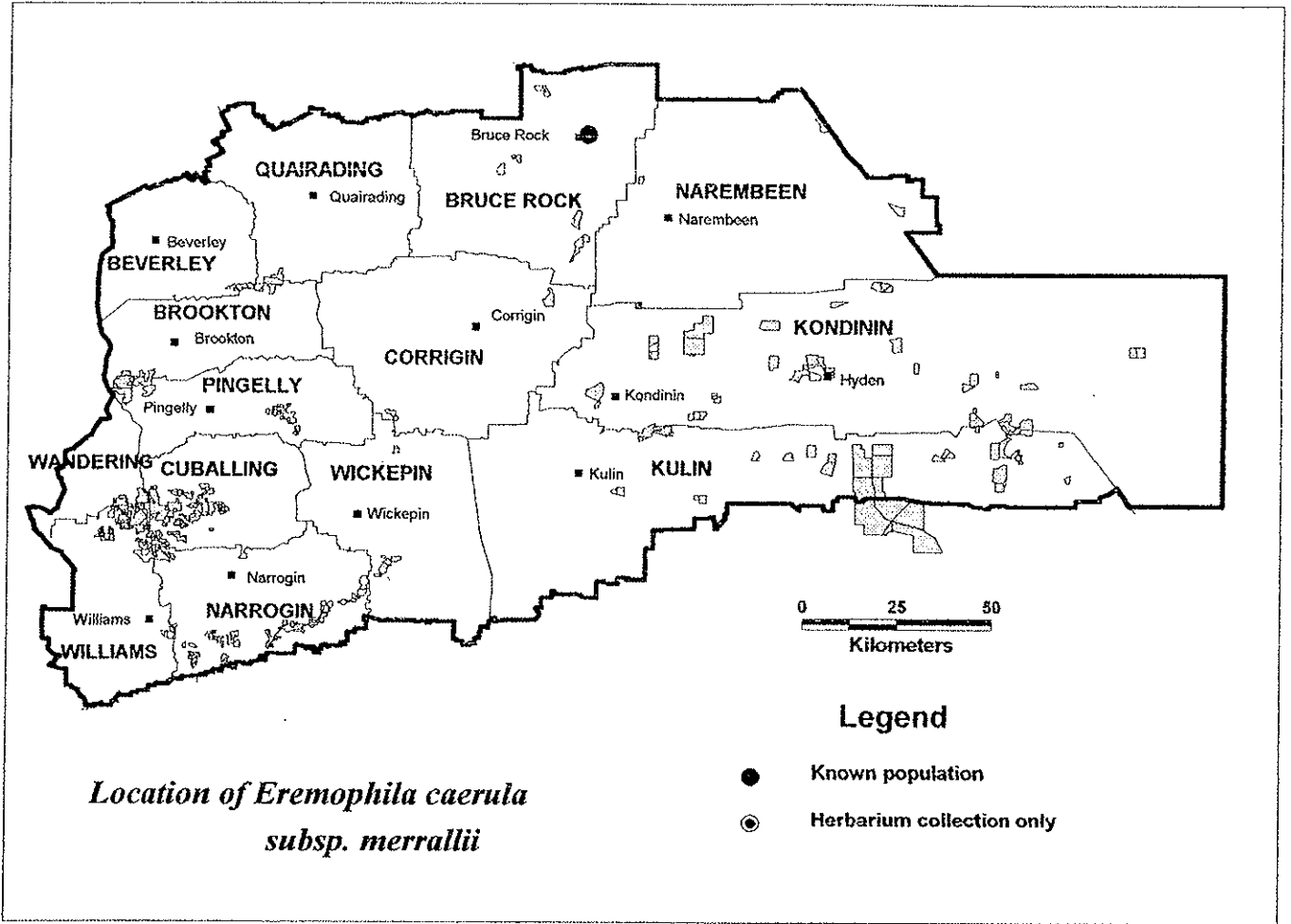
Management Requirements

- Population number 1 requires annual monitoring for species decline and recruitment.
- The underground water pipe maintained by the Water Corporation requires replacement. When replaced, divert the pipe around the population into the adjoining private property.
- It is essential that plant material remain in cultivation at the Adelaide Botanic Gardens and the Kings Park Botanic Garden.

Research Requirements

- The absence of seed in most fruits requires investigation.
- Additional surveys within the Vacant Crown Land in the eastern portion of the Wheatbelt Region and Goldfields Region to locate additional populations of this species remain a priority.
- A strategy for the long term management, protection and enhancement of population number 1 is required.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References Ewart, White & Wood (1911), Moore (1900).



Eremophila inflata C.A. Gardner
(now *Calamophoreus inflatus*)
Swollen or Bell - Flowered Eremophila.

MYOPORACEAE

A shrub to 2 metres high with the branchlets sparingly resinous and warted, hairless except for the flowers. The leaves are inversely lanceolate, up to 3 cm long and 3.5 mm wide, with a blunt and occasionally shortly hooked tip, narrowed at the base, stalkless or shortly stalked, only the central vein conspicuous. The flowers are solitary or sometimes in pairs on each axil, violet or pink in colour, shortly tubular or cup shaped but much inflated at the base. The 0.3 x 0.25 cm fruit is egg shaped, beaked, and hairy. The species name refers to the very much inflated base of the corolla especially after fertilisation. This species can be distinguished from other *Eremophila* species by the calyx segments, which are reflexed, the shape of the base of the corolla, which is very much inflated, and by the shape of the corolla lobes, which are very short with a blunt or rounded end.

Flowering Period: May to December.

Distribution and Habitat in the Narrogin District

In the Narrogin District it is known from two locations east of Hyden, in the Forrestania area. It occurs on brown clay loam to red clay soils associated with *Eucalyptus* low woodland.

Conservation Status

Current: Declared Rare Flora[#]

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|---------------|-------------|-------|-------------|---------------|---------------------------------|
| 2 Forrestania | 18/03/94 | Kon | RVS VCL | + 0 | Destroyed by fire or bulldozer. |
| 3 Forrestania | 18/03/94 | Kon | RVS | 0 | Dead. |

Kon Shire of Kondinin
* population known only as Herbarium record

Response to Disturbance

This species is favoured by physical disturbance, because it is only known on disturbed road verges and adjacent disturbed areas. The decline in numbers within the populations over recent years indicates it is not long lived. Effects from fire, weed invasion and grazing are unknown however, should be determined after the recent Forrestania wildfire.

Susceptibility to *Phytophthora* Dieback

Not Known.

[#] now Priority 4 (updated at December 1999)

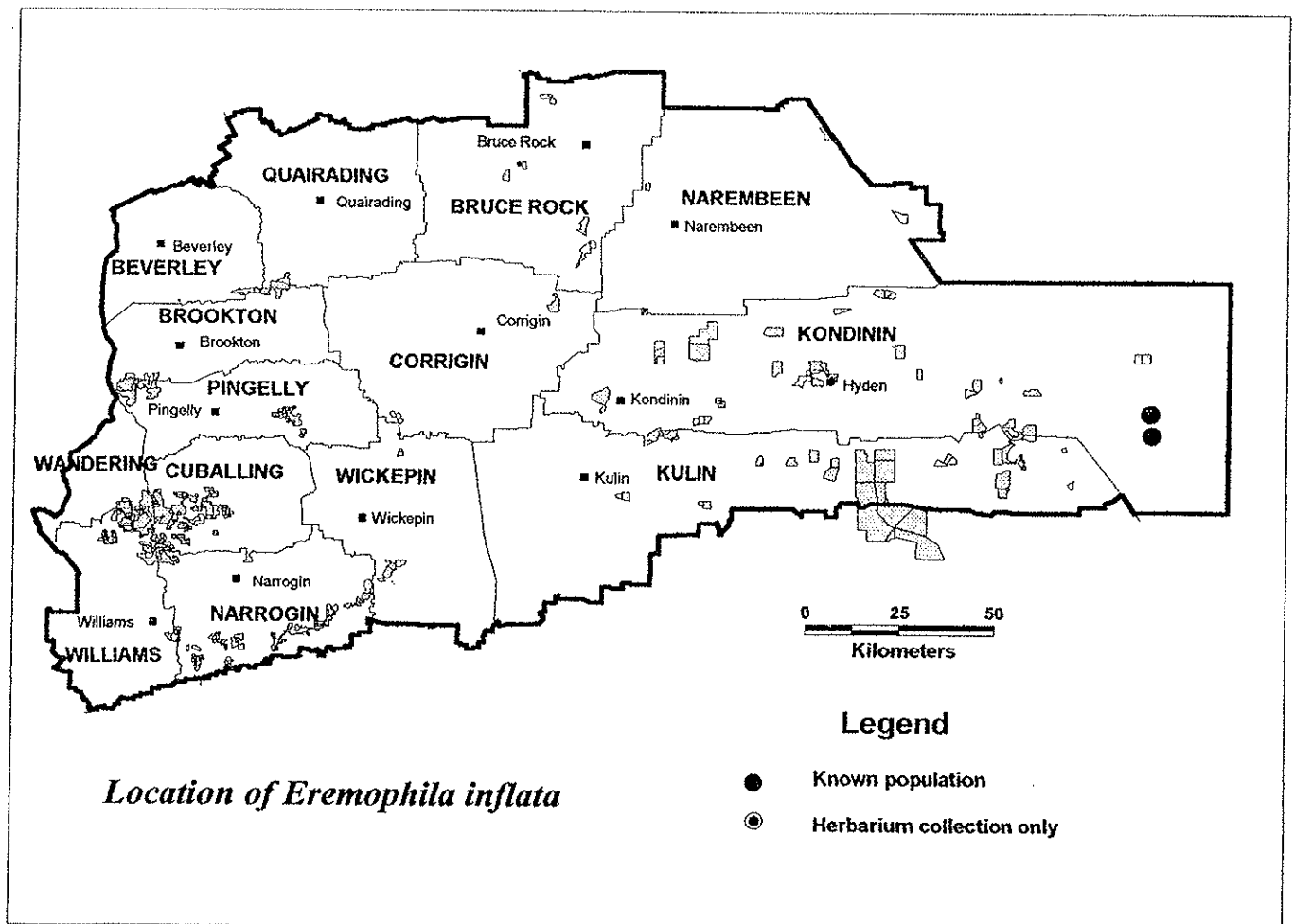
Management Requirements

- Monitor known populations occasionally.

Research Requirements

- Study the long term seed viability and recruitment patterns in the populations following disturbance and fire.
- Survey conservation reserve areas and Vacant Crown Land to locate populations in areas other than road verges.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References Gardner (1942), Patrick and Hopper (1982).



Showy Eremophila

A fast growing shrub 0.3 - 1.6 metres tall. The leaves are alternate, narrowly inversely lanceolate, pale green, soft, and thick. Flowers are solitary in the leaf axils. The corolla when in bud, is coloured orange above and yellow to yellowish - orange below. Corolla when mature, is reddish-purple. The 9-13 mm diameter fruit has a slightly fleshy outer layer, green when immature, with small dark blotches and whitish -grey when mature. The middle layer is dark brown, irregularly warty, fissured and woody. One 4-5 mm long 1.5 mm broad, whitish grey seed occurs in each chamber. The species name refers to the flower heads in which the terminal flowers are the last to develop.

Flowering Period: October to December.

Distribution and Habitat in the Narrogin District

Only one plant remains in one population which was burnt by a wild fire on 24/01/94.

Conservation Status

Current: Declared Rare Flora[#]

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|----------------------|-------------|-------|-------------|---------------|------------------------------------|
| 1,3,4 Forrestania | 18/03/94 | Kon | RVS | 1 | Road shoulders disturbed by grader |
| 2* Forrestania | 22/07/88 | Kon | RVS | 0 | Not re found |

Kon Shire of Kondinin
* population known only as Herbarium record

Response to Disturbance

This species appears to be relatively short lived and is favoured by disturbance. In 1988 a roadside population was destroyed by grading and 180 seedlings germinated in 1989 on the disturbed site growing vigorously within the first 12 months.

Appears to be a post fire pioneer, after a wildfire it may appear in large numbers over a wide area with the ability to grow quickly and set seed in the first season following fire. Weeds do not appear to affect survival.

Regenerates naturally from seed rather than by root suckers and is pollinated by birds.
Easy to strike from cuttings in nurseries.

[#] now Priority 4 (updated at December 1999)

Susceptibility to *Phytophthora* Dieback

Not Known. Unlikely to occur in eastern habitats.

Management Requirements

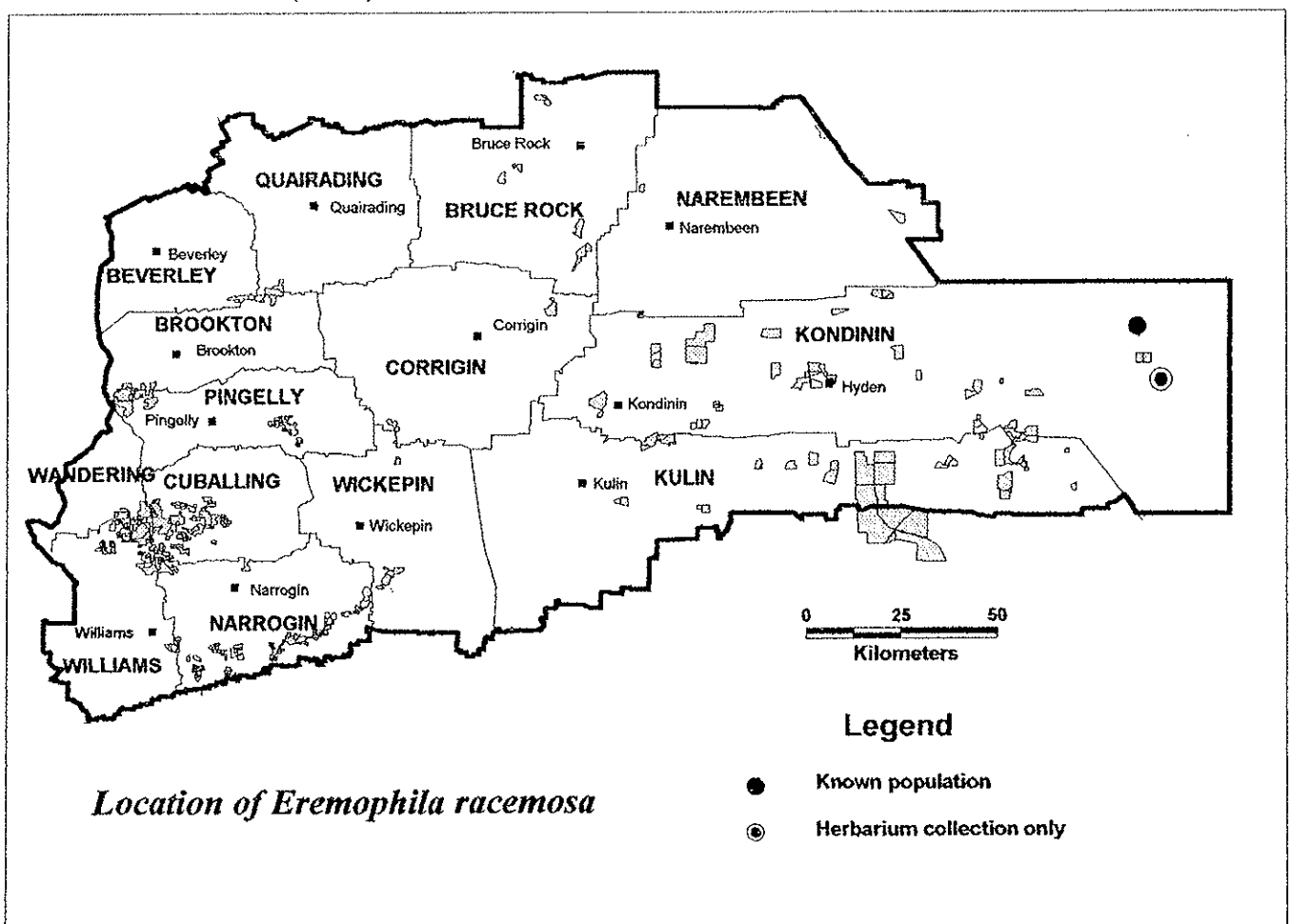
A recent large wildfire on 24/01/94 has provided an opportunity to study this species' survival and germination following a wildfire event. All the known populations of this species were burnt on the 24/01/94.

- Maintain suitable plants in cultivation at Kings Park for cutting material and research.
- Maintain protection of roadside shoulders where populations are known to occur.

Research Requirements

- Monitor population numbers 1, 3 and 4 in January 1995, and then at six monthly intervals for two years for regeneration following the fire. Establish monitoring quadrats within the burnt area. Record the extent of germination within the adjacent woodland and provide a report showing the extent of the population after the fire.
- Record the possible germination of seedlings at number 2 following the fire.
- Survey at similar sites within the burnt area for additional populations and provide recommendations for its future management.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium

References Chinnock (1979).



Eremophila veneta R.J. Chinnock. **ms.**

MYOPORACEAE

Metallic-Flowered Eremophila.

A low, open shrub to 60 cm high and up to 1 metre in diameter. The branches are glandular-resinous, bearing densely-clustered, inversely lanceolate leaves. Flowers are solitary, supported by a long flattened pedicel, 3-4.5 mm, shorter than the sepals. The corolla is 17-18 mm long, metallic blue-green above, yellow below and inside. The lobes of the upper lip are very close together.

Flowering Period: October to December.

Distribution and Habitat in the Narrogin District

A species of scattered distribution, occurring in the Narrogin and Katanning Districts. Known from one population in the Narrogin District growing within mallee woodland. Associated species include *Eucalyptus annulata*, *Atriplex* sp., *Rhagodia preissii*, *Acacia merrallii* and *Enchylaena tomentosa*. Occurs on light brown loamy soils.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|--------------|-------------|-------|-------------|---------------|---|
| 2A+B | 23/09/93 | Kul | NR | 10 | Healthy. |
| ? * Kondinin | 14/09/93 | Kon | RVS | 0 | Not relocated. Previous collection in 1976. |

Kul Shire of Kulin
Kon Shire of Kondinin
* population known only as Herbarium record

Response to Disturbance

Effects of environmental impacts unknown. May be adversely effected by salination.

Susceptibility to *Phytophthora* Dieback

Not Known.

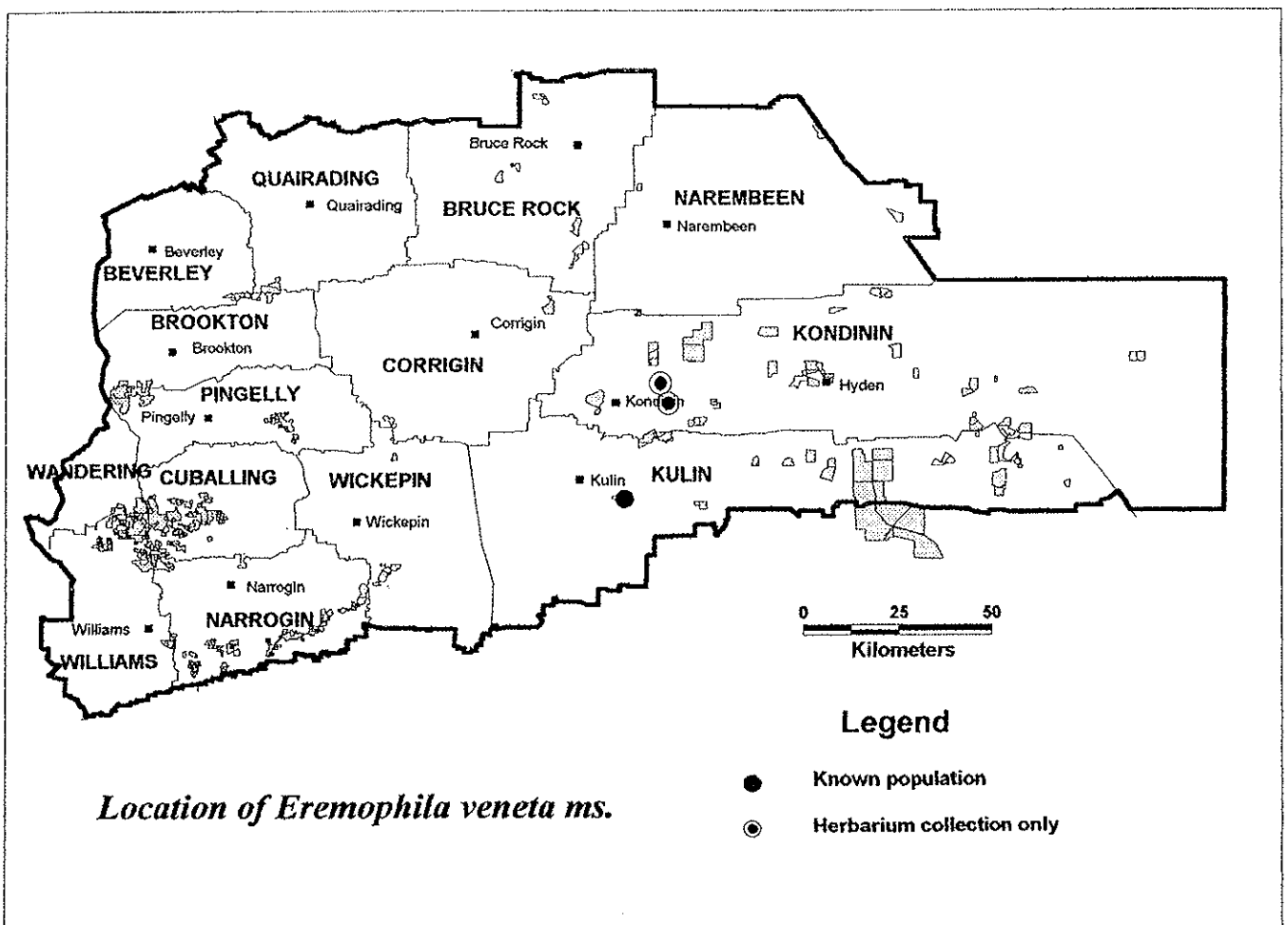
Management Requirements

— Protect population number 2 from any possible future disturbance.

Research Requirements

- Survey for additional populations especially on conservation reserves within its known range.
- Monitor known populations at least every two years.
- Endeavour to relocate populations from previous collection sites especially the site 5 kilometres east of Bending.
- Study life history and environmental impacts.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References Hopper *et al.* (1990).



Whorled Eremophila.

A low spreading shrub up to 0.8 metres high and 1 metre in diameter. It is recognised by its strong offensive odour. The branches are nearly cylindrical, erect or spreading. The 2.5-6 cm long and 1 mm wide leaves are attached to the branches without a stalk, in whorls of 3, pressed together without being united to the branches, green to purplish in colour, fleshy, narrowly oblong. The flowers 1 per axil, are stalkless. Sepals are 4, green, linear to lanceolate, 1.5-5 mm long and 0.3-1 mm wide. The corolla is 8-11 mm long, violet in colour, the inside of the tube is white on the lower surface and purple spotted and 2 lipped. The outside corolla surface covered with soft hairs. The fruit is dry, egg shaped, 2-3 mm long and 1-2.5 mm wide, beaked and slightly separated at the apex and covered with feather-like hairs. The species name refers to having leaves arranged round the stem in a ring, radiating like the spokes of a wheel. It is closely allied to *E. ternifolia* but differs in having smaller, narrowly appressed leaves and a fruit in which the carpels are neither unequal nor free in the upper half.

Flowering Period: October to January.

Distribution and Habitat in the Narrogin District

The population in the Narrogin District is presumed extinct.

At Lake Cobham in the Katanning District, *E. verticillata* occurs in powdery, brown loam over limestone in open low *Eucalyptus* woodland of *Eucalyptus longicornis*, *E. annulata* and *E. flocktoniae*. It is associated with *Maireana erioclada* and *Threlkeldia diffusa*.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|------------|-------------|-------|-------------|---------------|--------------------------|
| 4 Kalgarin | 09/06/88 | Kul | PP | Nil | Area cropped and grazed. |

Kul Shire of Kulin
* population known only as Herbarium record

Response to Disturbance

Species appears to favour disturbance and disturbed sites however, repeated disturbance will eliminate populations.

Response to fire, weed invasion, disease and salinity are unknown.

Appears not to be grazed when made accessible to sheep.

Susceptibility to *Phytophthora* Dieback

Not Known.

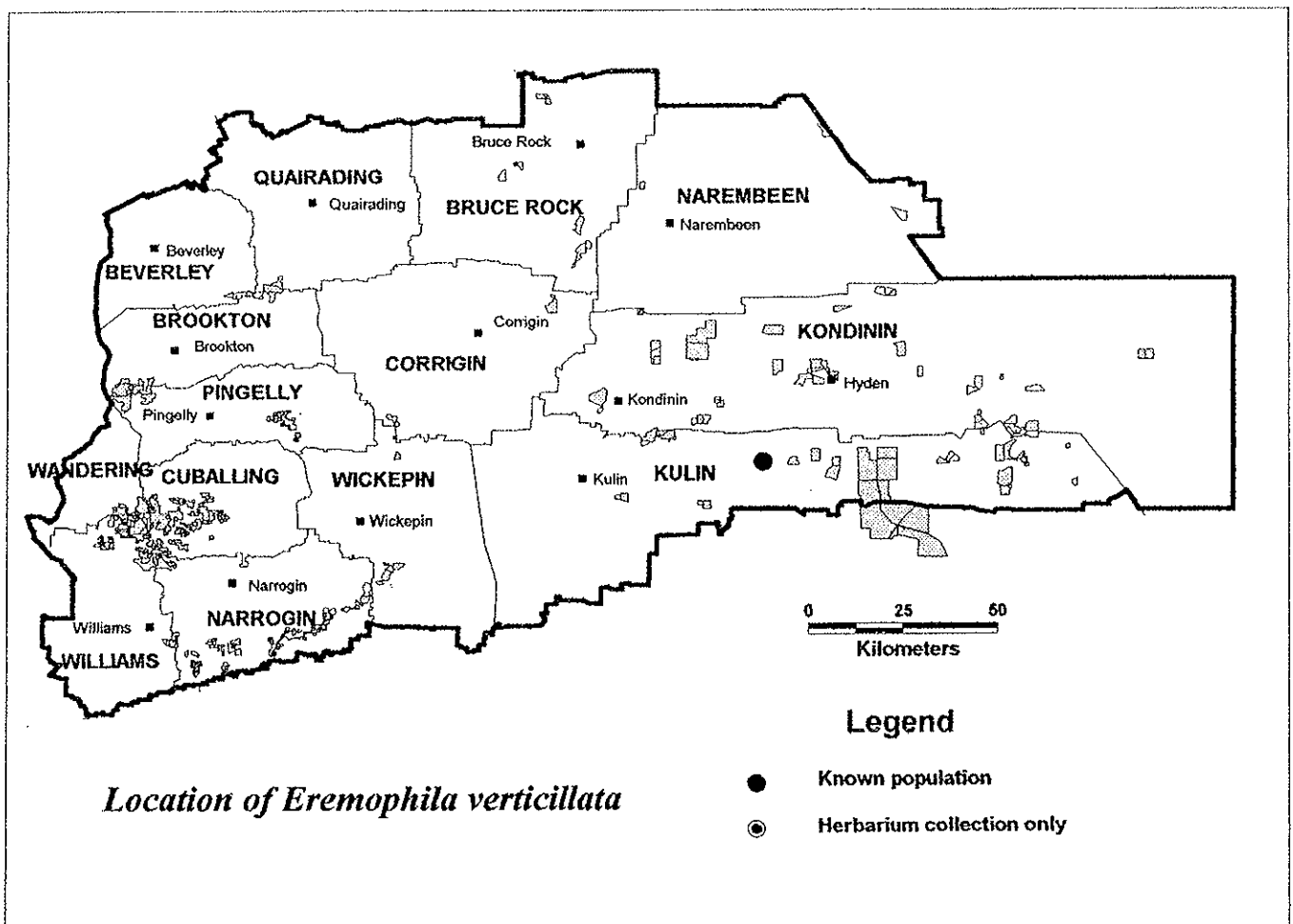
Management Requirements

- Maintain in cultivation. Strikes easily from cuttings. Plants raised from cuttings collected at population number 4 are growing at the Adelaide Botanical Gardens.

Research Requirements

- Survey population number 4 and surrounding area for possible plants and new populations.
- Continue to survey for additional populations on conservation reserves and other similar sites in the Narrogin District.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References Chinnock (1985), Hopper *et al.* (1990).



Eucalyptus olivacea Brooker and Hopper ms.

MYRTACEAE

Granite Mallee.

A tall smooth-barked mallee to 7 metres tall with broad lanceolate leaves that are 12 cm long by 2.5 cm wide, glossy and olive green in colour. The peduncle is erect and flattened. The 3.8 cm long by 6 mm wide buds are elongated with a horn shaped operculum. Fruit is hemispherical to cup shaped, in an erect cluster, 7 mm long and 9 mm wide. The manuscript name refers to the olive green colour of the leaves.

Flowering Period: November to December.

Distribution and Habitat in the Narrogin District

E. olivacea ms has a scattered distribution, with two separate population areas. It is confined to an area about 30 kilometres north of Newdegate and a small population south of Narrogin. It occurs on the edge of granite outcrops or granitic extrusions. It may be found associated with *E. loxophleba*, *E. albida*, *E. astringens*, *E. phaenophylla*, *Acacia lasiocalyx* and *Allocasuarina huegeliana*.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|----------------|-------------|-------|-------------|---------------|-------------------------------|
| 8 Dragon Rocks | 17/01/90 | Kul | NR | 5 | Undisturbed near firebreak. |
| ? Quinns | ? | Nar | SF | ? | Reported to occur (K. Atkins) |
| ?*Borgey | 13/06/88 | Nar | SF | ? | Herbarium specimen only. |

Kul Shire of Kulin
Nar Shire of Narrogin
* population known only as Herbarium record

Susceptibility to *Phytophthora* Dieback

Not Known.

Response to Disturbance

Response to all environmental effects are unknown. It probably re-sprouts from a woody underground root stock following a fire.

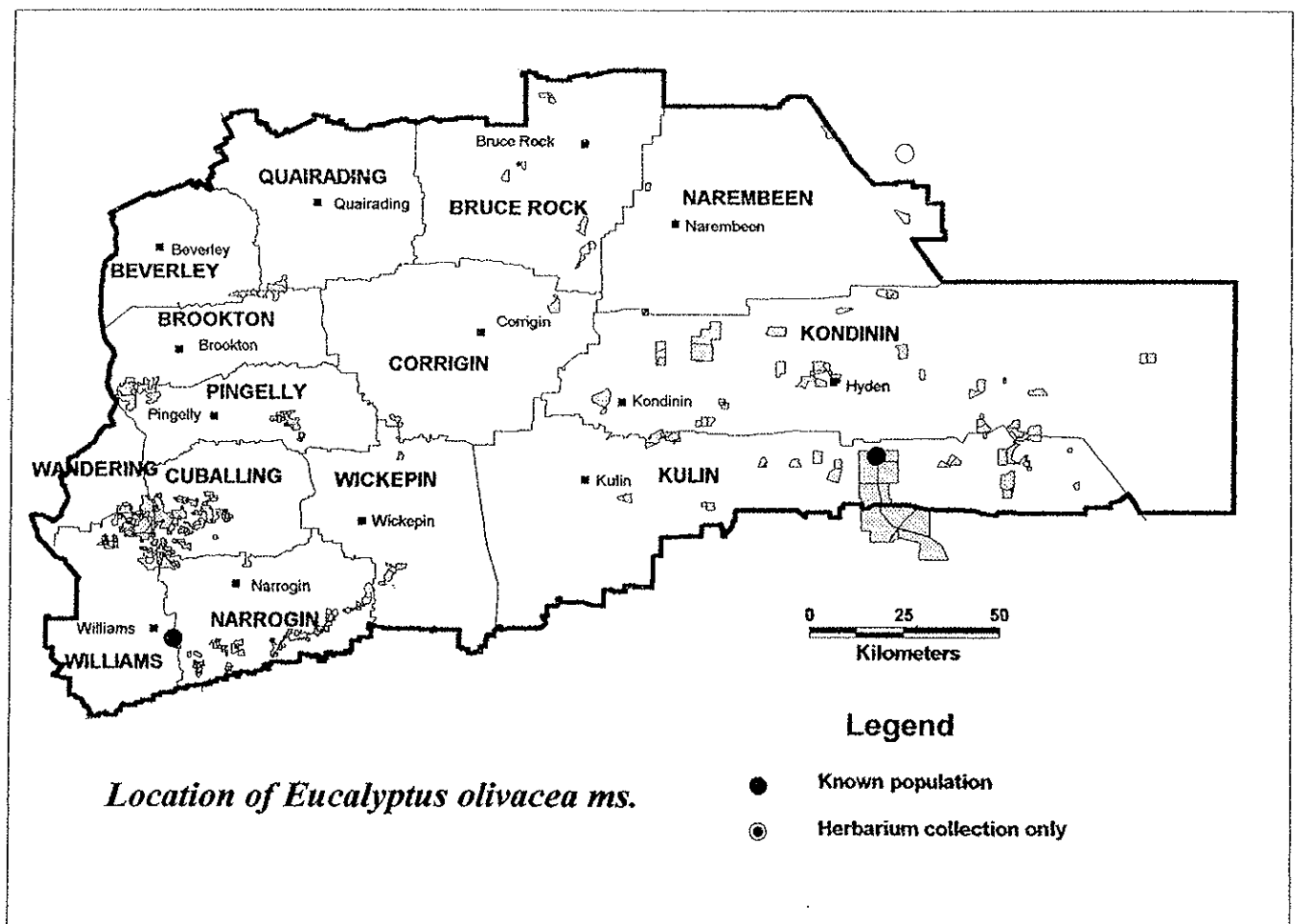
Management Requirements

- Install roadside marker pegs at population number 8.
- Ensure that population number 8 population is adequately protected during reserve management operations.

Research Requirements

- Survey to relocate population known to occur in the Highbury area.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References Brooker and Kleinig (1990), Hopper *et al.* (1990).



Steedman's Mallet

A small erect smooth barked tree or mallee to 12 metres high with smooth red-brown bark and often having small strips of older bark adhering to the short trunk or branches. The canopy is rounded with glossy olive-green leaves that are 8 cm long by 1.5 cm wide. Buds and fruits are yellow-brown and 4-sided with each fruit growing up to 2.2 cm long by 1.7 cm in diameter. The stamens are usually yellow, but are occasionally pink or red.

Flowering Period: January to March.

Distribution and Habitat in the Narrogin District

A species of restricted distribution, usually occurring in more or less pure stands on undulating gravelly loam country about 80 kilometres east of Hyden in the Forrestania - North Ironcap area. All known populations occur within the Narrogin District.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|---------------|-------------|-------|-------------|---------------|--------------------------------|
| 1 Forrestania | 23/03/94 | Kon | VCL | - | 5000 prior to 2/03/94. |
| 2 Forrestania | 23/03/94 | Kon | VCL | - | 10000 prior to 22/03/94. |
| 3 Forrestania | 23/03/94 | Kon | VCL | - | 500 prior to 22/03/94. |
| 4 Nth Ironcap | 04/04/89 | Kon | VCL | 100000+ | Probably all burnt January 94. |
| 5 Nth Ironcap | ? | Kon | VCL | ? | Unknown. Requires survey. |
| 6 Wattle Rock | 20/09/93 | Kon | VCL | ? | Requires survey. |

Kon Shire of Kondinin
* population known only as Herbarium record

Response to Disturbance

Regenerates from seed following fire or disturbance.

Because all populations occur within a vast area of bushland, impact from weed invasion is unlikely unless major mechanical disturbance of a population occurs.

Populations near mining operations may be damaged through mining or exploration.

Susceptibility to *Phytophthora Dieback*

Not Known.

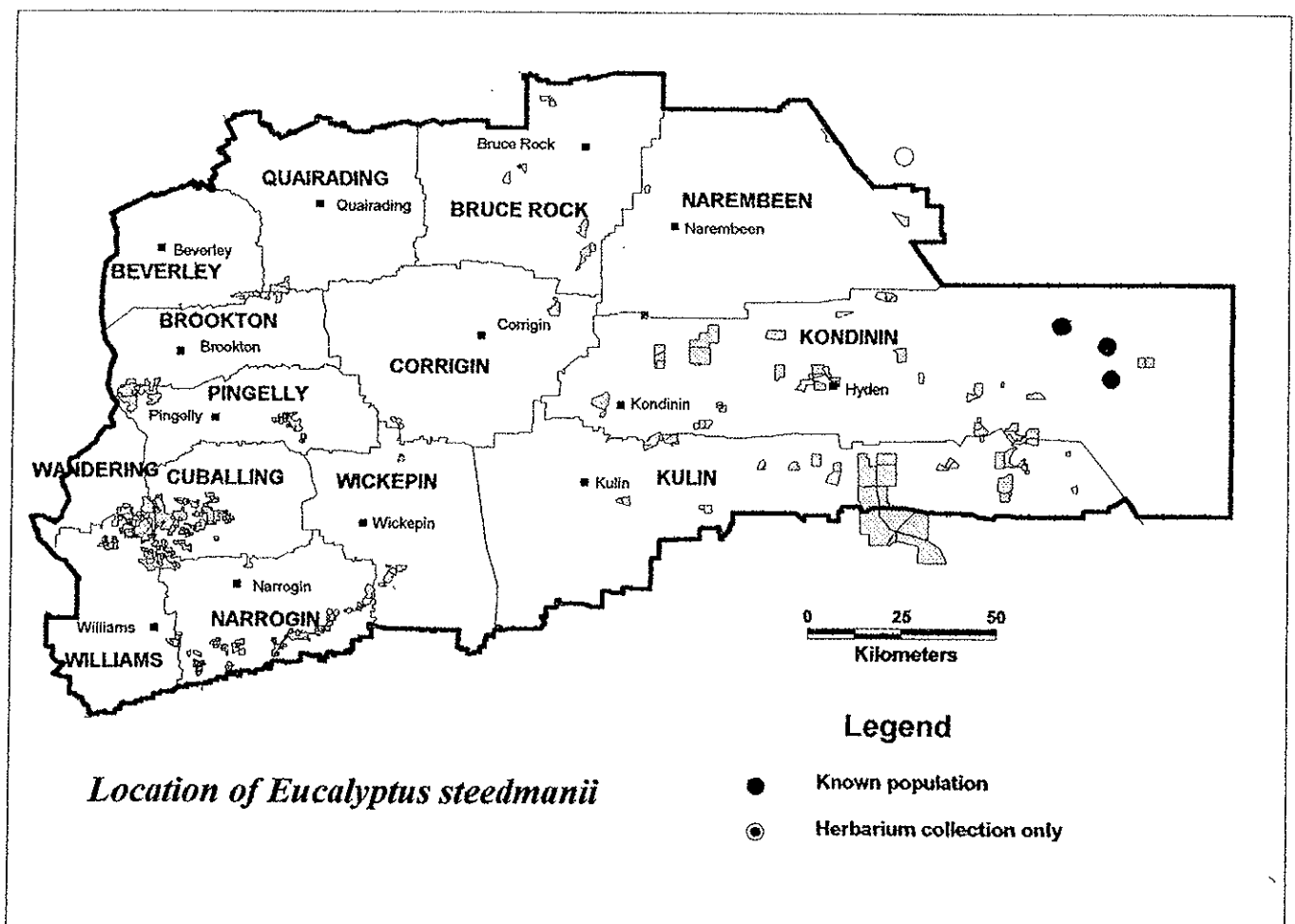
Management Requirements

- All populations require an inspection at least every five years to monitor the effect of mining operations on populations.
- Inclusion of at least one population within a conservation reserve is desirable and needs further investigation.
- Population number 5 and number 6 require a survey to be completed to accurately locate, and record population numbers.
- Liaison with the relevant mining companies ensuring they are aware of population locations.
- This species is currently available in cultivation from nurseries. Plants should be maintained at Kings Park and the Adelaide Botanic Gardens.
- A quantity of seed to be collected according to the protocols provided by the Threatened Flora Seed Centre at the W.A. Herbarium for storage at the centre.

Research Requirements

- Long term viability of seed in storage should be studied.

References Brooker and Kleinig.(1990), Chippendale(1973).



Grevillea dryandroides C.A. Gardner **subsp. *hirsuta***

Olde & Marriott

PROTEACEAE

Phalanx Grevillea

A tufty, prostrate, vigorously root-suckering shrub 10-30 cm high, up to 1 metre in diameter, usually forming colonies in excess of 50 clones. Within natural stands, it tends to grow as a clumped plant, not spreading, 0.1-0.5 metre across. Leaves are grey-green, the leaf axis pressed closely against the stem and covered with soft hairs. The leaf lobes are 12-35 mm long, hairy, the hairs crisped. The leaves are up to 12 cm long, with many hairy, linear segments to 12 mm long forming a V-shape with a mid rib. The racemes up to 70 mm long are tooth-brush like, dull red and borne terminally on long, bare prostrate stems. The fruit is hairy, about 1 cm long. The species name refers to the leaves, which resemble some species of *Dryandra*. The sub-species name refers to the persistent hairy covering.

Flowering Period: September-October, and February - March.

Distribution and Habitat in the Narrogin District

In the Narrogin District, one population occurs in a natural bush area of low heath. The remaining populations occur on disturbed roadsides. All roadside populations are severely weed infested.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|-------------|-------------|-------|-------------|---------------|---|
| 1 Mears | 21/07/92 | Bro | RVS | 2000 | Healthy, Roadside populations disturbed by grader. |
| 3 Jubuk | 11/11/92 | Cor | RVS+CBH | 100 | Weed infested, partly destroyed by fence construction. |
| 4 Jubuk | 11/11/92 | Cor | RVS | 4 | Weed infested. |
| 12 Corrigin | 28/09/93 | Cor | SR | 100+ | Healthy, new seedlings. Partly disturbed by road works. |

Bro Shire of Brookton

Cor Shire of Corrigin

* population known only as Herbarium record

Response to Disturbance

This species has a lignotuber up to 4 cm underground which can re-sprout following disturbance such as a fire. After a fire it was found that *G. dryandroides* regenerated rapidly from existing root stocks, and approximately 95% survived the fire. Vegetative growth and flowering increased following a fire. It appears to be a species that can withstand disturbance due to the rhizome roots., The largest populations occurring on road and rail verges. Weeds, especially veldt grass are a problem on all roadside populations in the Narrogin District. A study in 1992 indicated that the selective grass herbicide *Fusilade* was safe to use on *G. dryandroides*, however further testing on timing and rates are required.

Effects on grazing are unknown, but it is expected that grazing may have limited detrimental effects, given the plants ability to reshoot.

Susceptibility to *Phytophthora* Dieback

Not Known.

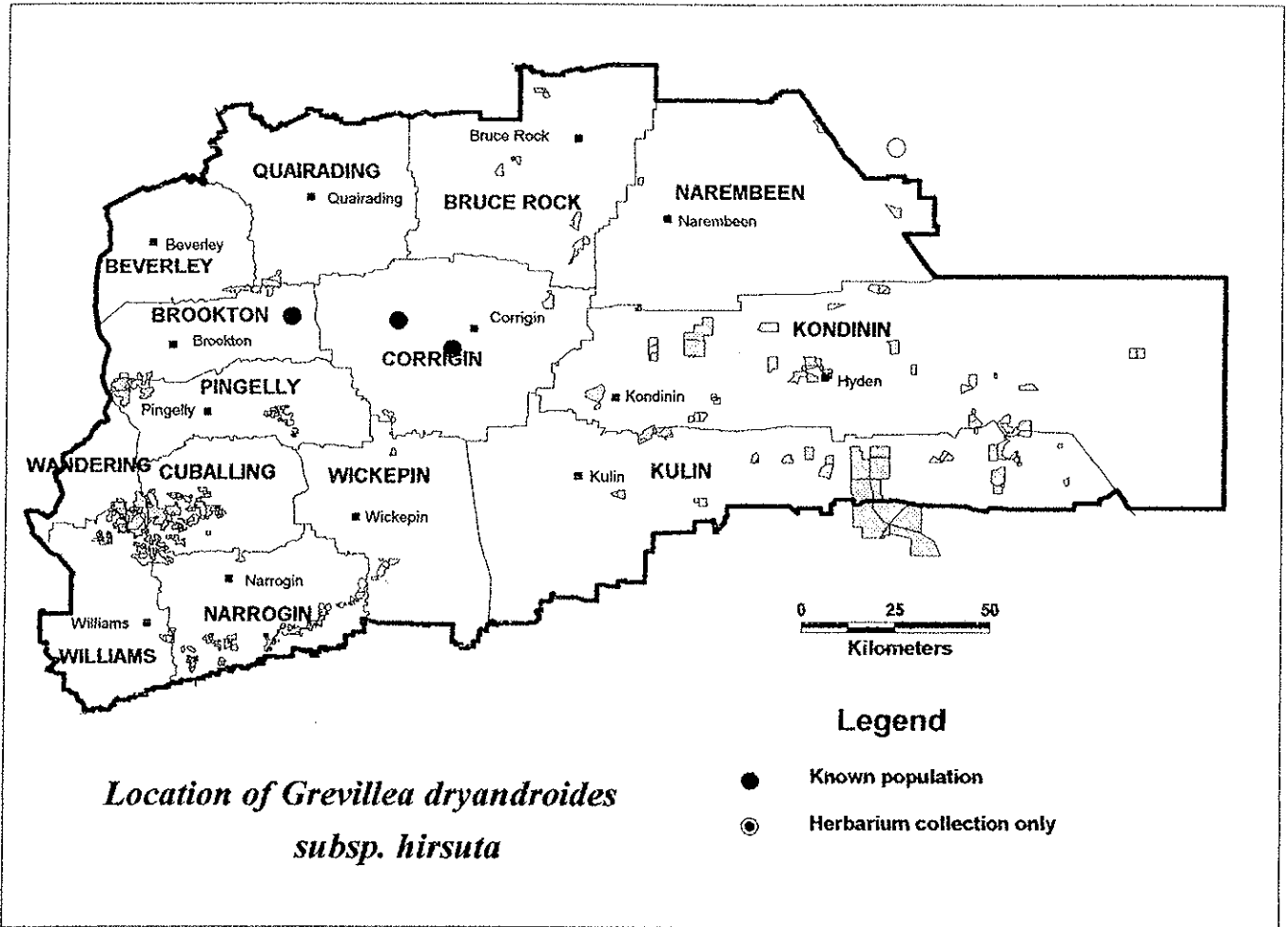
Management Requirements

- An annual inspection of all populations in the Narrogin District is desirable, given the amount of disturbance that has occurred on all the District's populations over recent years.
- Roadside markers to be installed at population number 12.
- Cultivated plants for cutting material to be maintained at Kings Park and Botanic Gardens.

Research Requirements

- Weed control methods to eradicate veldt grass from roadside populations are essential for the enhancement of these populations.
- Weeds control methods require further investigation.
- Surveys for new populations on conservation reserves with similar soil and vegetation.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References Leigh *et al* (1984), Hopper *et al* (1990), Erickson *et al* (1979), Gardner (1933), Rye and Hopper (1981).



Lake Varley Grevillea.

A spreading shrub up to 0.5 metres tall and 2 metres wide, with hairy branches and deeply divided leaves up to 3 cm long. The leaf segments number about 5-13 per leaf and are sharply pointed, narrow, usually about 0.5 cm long, with the narrow margins curled under towards the prominent central vein. The flowers are terminal, forming axillary clusters of 1-3 flowers, that are broad at the base, nearly 2 cm long including the curved, apparently orange style, surrounded by a whorl of persistent bracts, which are deep pink, pointed and about 0.5 cm long. Flower stalks are up to 1 cm long. The species name refers to the wrap of bracts about the inflorescence.

Flowering Period: June to November.

Distribution and Habitat in the Narrogin District

G. involucrata grows in shallow sand over laterite in open heath between Hyden and Lake Magenta. In the Narrogin District it is found growing in white sand over laterite, and laterite associated with open heath. This species grows well on previously disturbed road shoulders.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|------------|---|-------|-------------|---------------|------------------------------------|
| 14 | 26/08/92 | Kul | RVS | 0 | Plants removed by road works 1992. |
| 15A,B | 26/08/92 | Kul | NR+RVS | 18 | Disturbed sites. |
| Kul * | Shire of Kulin population known only as Herbarium record | | | | |

Response to Disturbance

Regenerates from root stock and seed following late summer- autumn fires.

Known to become established on road verges and firebreaks after disturbance. Seedlings and immature plants are killed by subsequent disturbance within 4 years.

Re-sprouting recorded after browsing by sheep.

Susceptibility to fungal diseases and weed invasion is unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

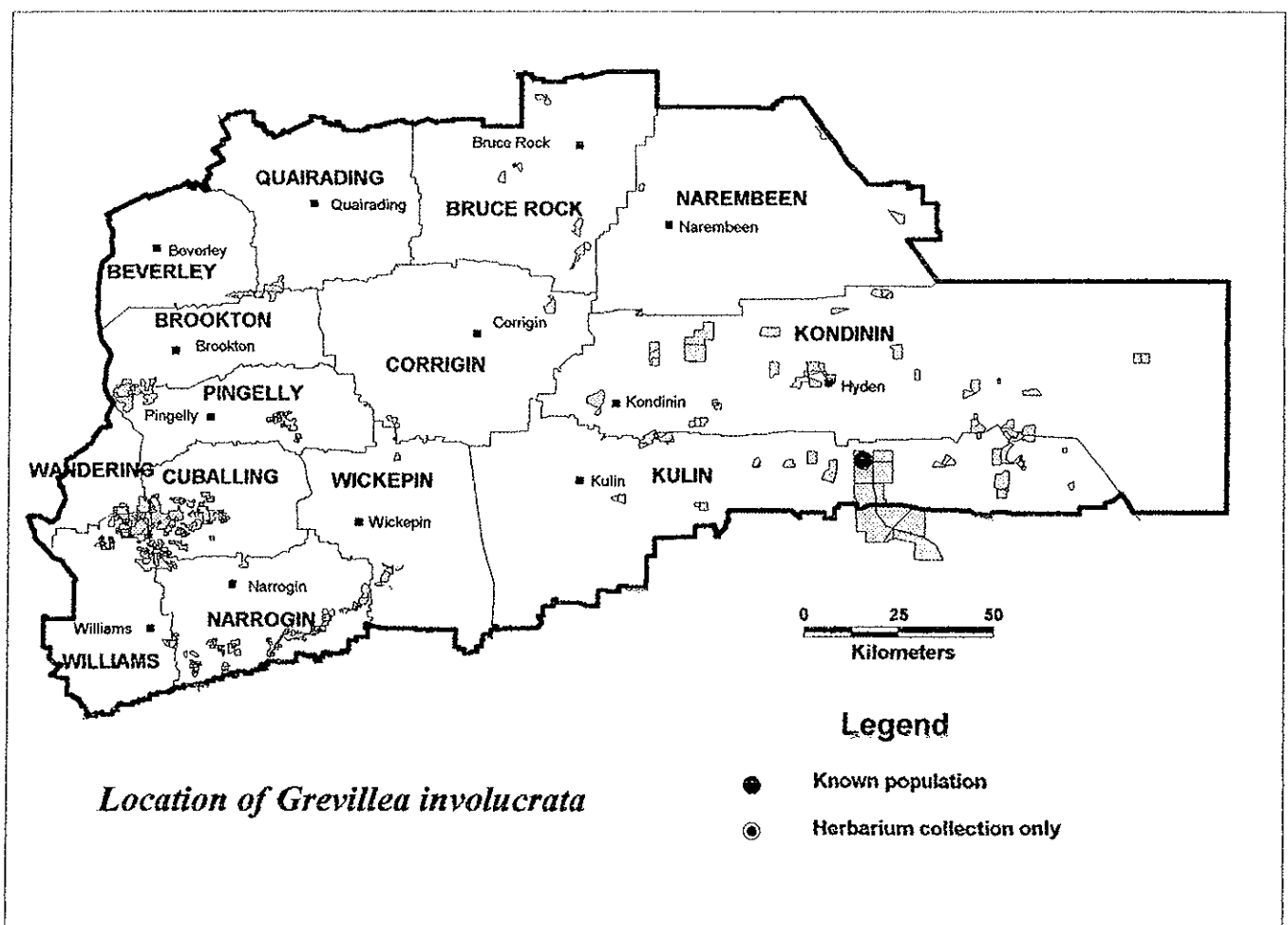
Management Requirements

- Monitor Narrogin District populations at least every 2 years, recording plant numbers and condition.

Research Requirements

- Survey for new populations in the Narrogin District on conservation reserves containing similar habitat.
- Survey population number 14 for seedling germination following disturbance.
- Determine optimum fire regimes.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References George (1974), Rye and Hopper (1981), Hopper *et al.*(1990).



Corrigin Grevillea.

A prostrate shrub 5 to 10 cm high and up to 2 metres across, with creeping, slightly hairy stems. The 3 to 9 cm long leaves are at first hairy, erect on slender stalks, divided and growing on a long leaf stalk, leaves lobed three-quarters to almost the base of the midrib, with flat and sharply pointed lobes. Mature leaves are hairless, slightly leathery, and slightly prickly. The flowers are creamy-white, sweetly scented, borne in globular heads 4 cm in diameter, on 30 cm high peduncles. The fruit is a slightly oblique and compressed follicle, sticky, 1 to 1.5 cm long containing two seeds. The species name refers to the very distinctive long slender flower peduncles of this species.

Flowering Period: October to November.

Distribution and Habitat in the Narrogin District

Only known from within the Narrogin District. Has been mainly collected from an area bounded by Corrigin, Bullaring, Bulyee and Quairading, with a single collection recorded from Hyden in 1970.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|------------------|-------------|-------|-------------|---------------|--------------------------------|
| 1A+B Corrigin | 28/03/93 | Cor | RVM+SR | 1 | Large plant dead. |
| 2 Mears | 18/03/93 | Bro | RVS | 1 | Population in decline. |
| 3A+B Jubuk | .02/94 | Cor | RVS | 0 | All plants killed by locusts. |
| 4 Corrigin north | 29/10/93 | Cor | RVS | 6 | All healthy. One erect plant. |
| 5 Bullaring | 26/11/92 | Cor | RVS | 31 | Mostly healthy. New seedlings. |
| 6 Corrigin north | 26/11/92 | Cor | RVS | 1 | Single plant. |
| 7 Jubuk | 09/03/93 | Cor | RVS | 1 | Single plant on grader scrape. |
| 8 Corrigin | .11/92 | Cor | SR | 2 | Small plants on road edge. |
| 9 Bulyee | 21/11/94 | Cor | NR | 2 | On old firebreak in reserve. |

Cor Shire of Corrigin

Bro Shire of Brookton

* population known only as Herbarium record

Response to Disturbance

Appears to be a short lived species favouring disturbance for seed recruitment. This is indicated by all known populations occurring on previously graded roadside shoulders.

Response to fire is unknown.

Veldt grass is common within most populations and may affect seedling recruitment.

Susceptible to grazing by insects, especially locusts.

Susceptibility to *Phytophthora* Dieback

Not Known.

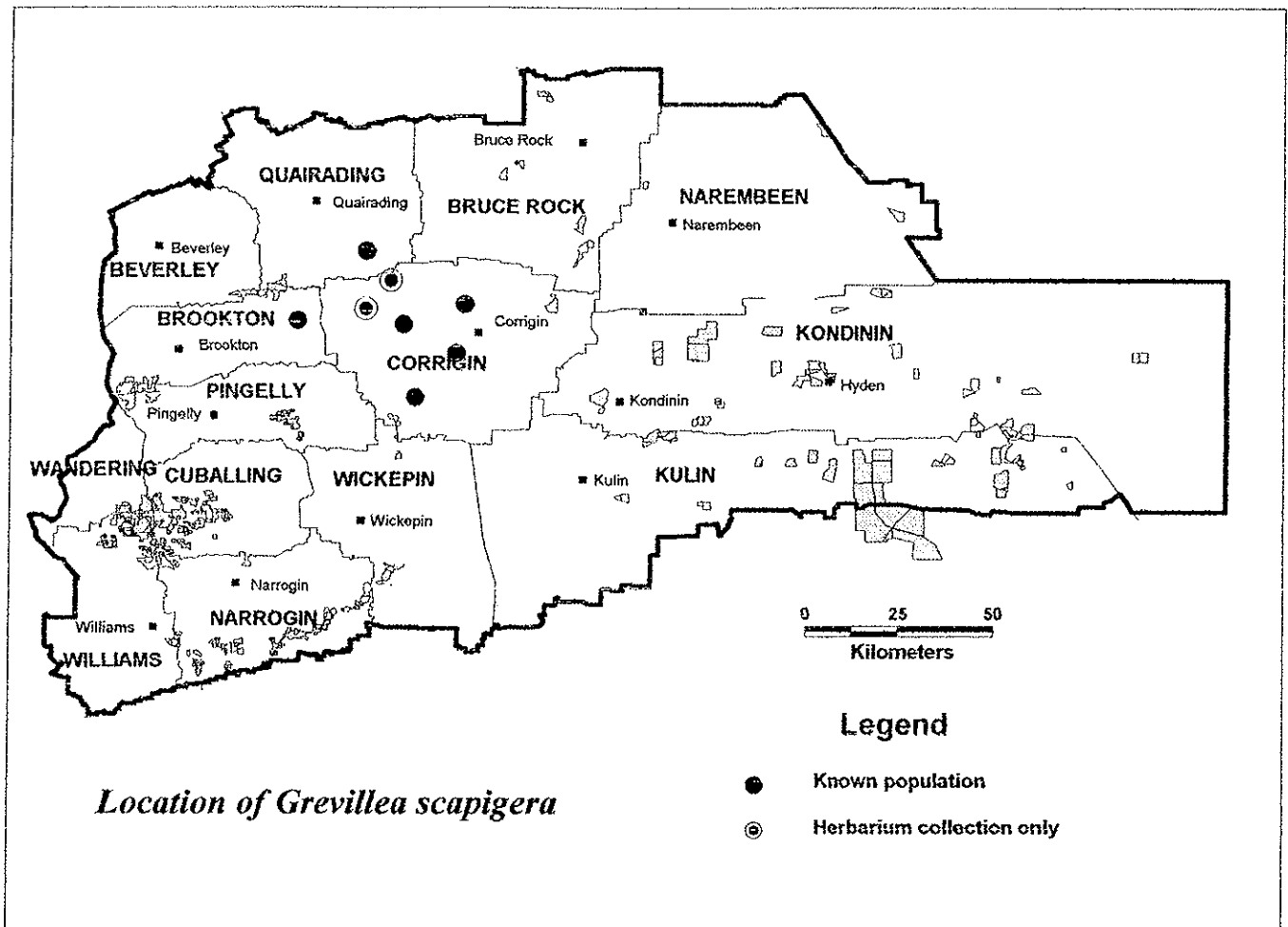
Management Requirements

- All populations are at risk from future disturbance by road maintenance, farming operations, weed invasion and insect attack.
- Implement recovery actions as described within the approved Recovery Plan prepared for this species.
- Inspect all populations annually.
- Maintain plant material in long term cryostorage at Kings Park Botanic Gardens.
- Plant material for genetic studies and cryostorage to be collected from all new populations.
- Liaise with the Shire of Corrigin concerning continued protection of roadside populations on an annual basis.

Research Requirements

- Research studies into this species will determine the long term management requirements for the survival of natural and established populations.
- Maintain parent plant material in cryostorage.
- Effect of fire and smoke on recruitment from seed should be investigated.
- Seedling cultivation at Kings Park to continue.
- Establishment trials of cultivated plants within known populations and new populations within bushland to continue.
- Surveys to locate populations on conservation reserves remain a priority.

References George(1974), Dixon (1992).



Column Hakea.

A very slow growing shrub to 3 metres tall with a lignotuber, having several upright stems growing from the base. Branchlets are numerous, spreading, mostly 1-5 cm long, making the branchlets look like dense columns. The 4 cm long and 0.8 cm wide leaves are scattered, more crowded towards the end of the branchlets, ending in a sharp needle-like point, shortly stalked or stalkless, and initially hairy. The flowers are yellow, strongly scented and are directly attached along a short stalk, bearing 15-22 flowers. The ovary is red, the style is red at the tip and yellow below. The fruit is pale brown. The species name refers to the very pointed tips of the leaves.

Flowering Period: September to October.

Distribution and Habitat in the Narrogin District

Occurs in scrub and tall shrubland, high in the profile or on hilltops, on pale white loamy sand and gravelly soil. It may be found associated with species that include *Eucalyptus macrocarpa*, *Dryandra horrida*, *D. fraseri*, *Leptospermum erubescens*, *Allocasuarina campestris*, *Banksia sphaerocarpa* and *Daviesia oxylobium* ms.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|---------------------|---|-------|-------------|---------------|-------------------------------------|
| 3C Rabbit Rd | 6/91 | Qua | RVS | 3 | Part of Popn of 40 plants. |
| 13 Maynard Rd | 11/87 | Qua | RVS | 0 | 3 in 1882 |
| 14 Goldfields Rd | 5/88 | Qua | RVS | 0 | 7 in 1982 |
| 16 Quairading | 15/02/94 | Qua | WAR | 200 | Within Reserve in natural bushland. |
| 17A,B,C Brookton | 12/02/93 | Bro | RVS + PP | 58 | Rd res and PP fenced. |
| 18 Brookton | 9/89 | Bro | PP | 1 | |
| 19 Mawson | 08/90 | Qua | PP | 90 | Good. |
| 20 Boyer | 05/92 | Bro | PP | 278 | Fenced. Rabbits. Good condition |
| 21 Hobbs | 12/10/94 | Bro | PP | 9 | Requires fencing. Old plants. |
| Qua | Shire of Quairading | | | | |
| Bro | Shire of Brookton | | | | |
| * | population known only as Herbarium record | | | | |

Response to Disturbance

This species has a lignotuber so it is probably able to survive wildfires and prescribed burning. Weed infected sites appear to affect the health and condition of plants.

Weeds threaten all roadside populations and along with poor seed set, affect natural seedling recruitment. Poor seed set may be caused by lack of pollinators or insect attack.

Populations associated with sandy sites are usually affected by rabbits which may also affect seedling recruitment and disturb mature plants.

Seedlings raised in cultivation are very slow growing.

Some roadside populations may be affected by chemical sprays.

Susceptibility to *Phytophthora* Dieback

Not Known.

Management Requirements

Approximately 900 plants exist in the wild. Half the plants are in poor condition, while only six populations have healthy plants. This poor state can be attributed to road verge disturbance and the impact of weeds in the friable sandy loam soils in which the species grows. Active management of this species is necessary.

- An Interim Recovery Plan is required for this species along with funding to ensure the necessary recovery actions are implemented.

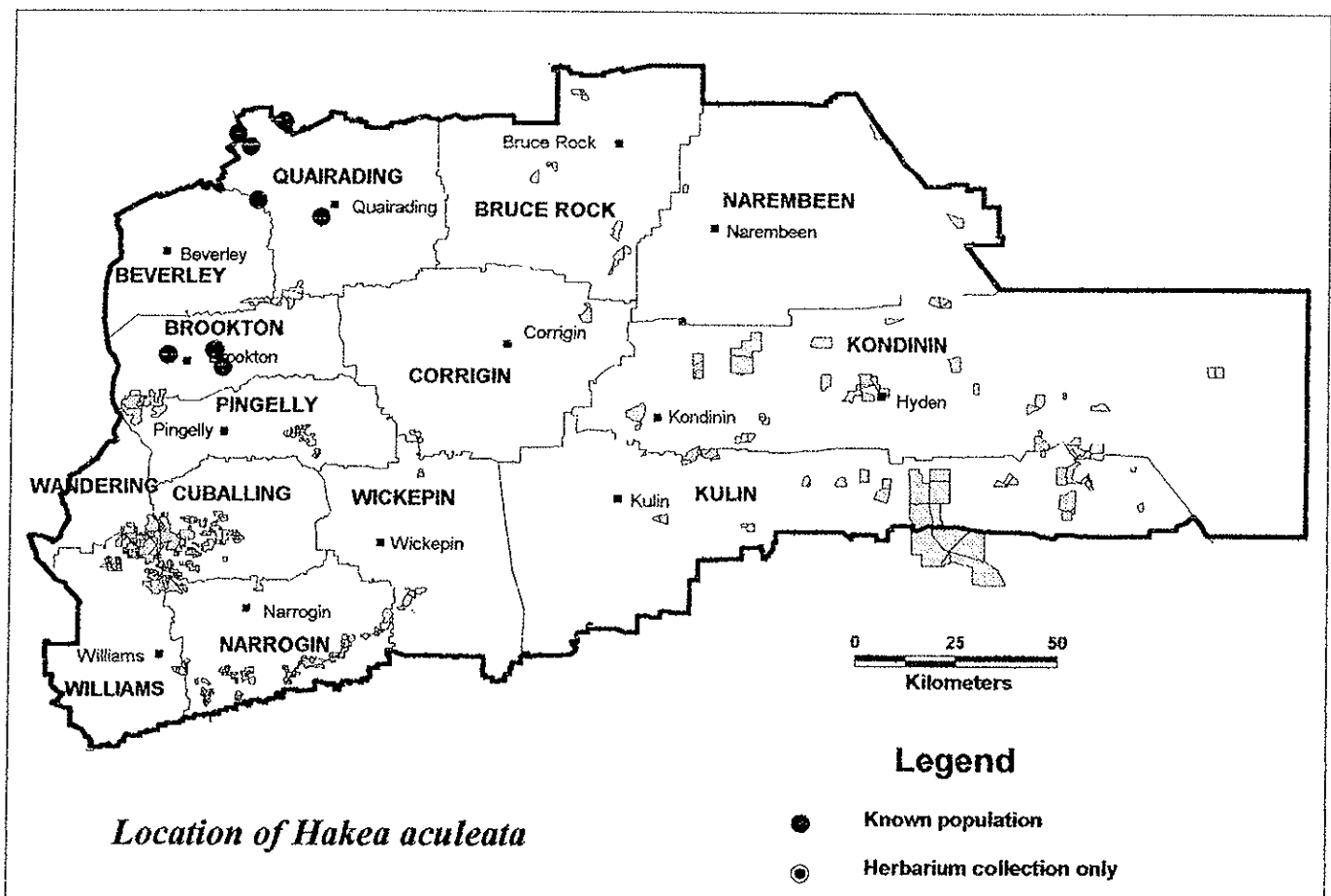
Specific management actions for Narrogin District populations are;

- Population numbers 13,14 and 18 require urgent surveys to establish numbers and provide management recommendations.
- The access track to population number 16 requires blocking to prevent vehicle access.
- Vesting of reserve which incorporates population number 16 requires changing to Nature Reserve.
- The undisturbed road reserve incorporating population number 17 requires vesting as Nature Reserve to secure population.
- A program for eradication of weeds and rabbits needs implementation.
- Collect seed from all populations for long term storage.
- Inspect all populations and complete accurate plans drawn for future monitoring at two yearly intervals. Record changes in population numbers and condition.
- Erect rabbit proof netting and eradicate rabbits at population number 20.
- Fencing of number 21 may be required.

Research Requirements

- Further surveys within the known species range should continue when resources permit.
- Trials to control weeds within populations requires further investigation.
- Natural recruitment from seed requires investigation.
- Artificial propagation and re-establishment trials should be considered in populations where active management is necessary.

References George (1979), Rye and Hopper (1981), Millar (1982), Leigh (1984) and Hopper (1984).



Scarlet Lechenaultia.

A small widely spreading shrub to 70 cm tall, with many branches curving upwards. The branches often sucker. The bark is rough. The leaves, sepals, and ovary are smooth without hairs. Leaves are narrow, 5.5-11.5 mm long, crowded and somewhat fleshy. The flowers are solitary occurring usually at the end of the branch. The sepals are 5-7.5 mm long. The corolla is 19-23 mm long, scarlet to orange-red, usually more orange on the lobes. The tube is densely hairy on the inside, usually orange. Lobes are equal, the abaxial lobes spreading, the adaxial lobes erect. The wings on the abaxial lobes are triangular, 1.5 mm-2.5 mm wide. On the adaxial lobes the 0.9-1.2 mm wide wings are triangular. The ovary is 6.5-9.5 mm long, the style 13.5-19.5 mm long, which is sparsely covered with glandular hairs. The fruit 17-29 mm long, articles in 10-20 pairs. The species name refers to the likeness to the larch.

Flowering Period: October to December.

Distribution and Habitat in the Narrogin District

Occurs from Meckering and Clackline and south to Kukerin. Known from one population in the Narrogin District, approximately 15 kilometres north-west of Brookton. Occurs on white sand over laterite, adjacent to a winter wet seepage area. May be found in association with open woodland of *Eucalyptus rudis* and *E. wandoo*. Other associated species include *Banksia attenuata*, *Melaleuca viminea* and *Jacksonia* sp. *L. laricina* was apparently common in the area between Meenaar, Meckering and Northam, but now it is confined to a few small populations. It's decline is due to extensive clearing of land for farms.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|---------------------|-------------|-------|-------------|---------------|------------------------------|
| 8A+B Hobbs/White | 12/10/94 | Bro | PP | 40 | Needs fencing. Being grazed. |

Bro Shire of Brookton
* population known only as Herbarium record

Response to Disturbance

Will tolerate some grazing as indicated by re-sprouting at population number 8A. Most plants are growing on an old firebreak, indicating it may favour some disturbance.

Susceptibility to *Phytophthora* Dieback

Not Known.

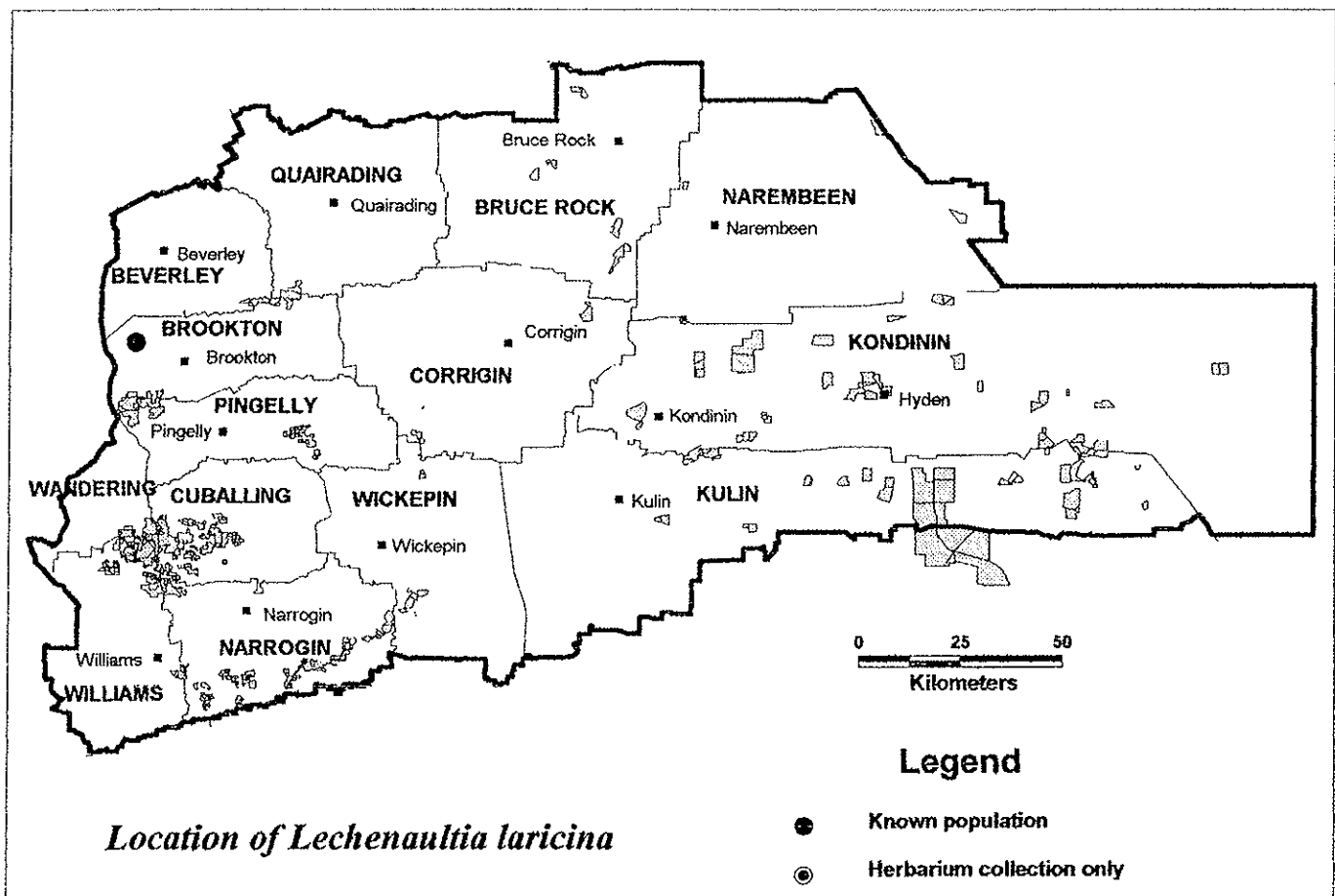
Management Requirements

- Liaison with landowners is needed on at least an annual basis.
- Inspect population annually, monitoring population number and condition.
- Maintain in cultivation at Kings Park Botanical Garden.

Research Requirements

- Further surveys on similar soil and vegetation types are required, especially on conservation reserves throughout its natural range.
- Investigate response to environmental impacts.
- Collect seed and cuttings for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References Morrison (1992), Carolin (1992).



Cushion Lechenaultia

A prostrate small shrub of fine greyish green foliage that forms low, round cushions up to 7 cm in height and 30 cm in diameter. Pointed, hairy, linear leaves up to 1 cm in length are densely clustered at the branchlet ends. The stems are often below the ground surface. Flowers are sky blue or purple around the edge and pale yellow in the middle. They are solitary in the upper leaf axils and cover the plant when in full flower. Five petals, hairy on the inner side, form a tube 8 mm long, the lobes 3 mm long. Each lobe ends in a narrow point and has two broad wings on either side. The petals are not erect and the flowers, similar to those of *L. expansa*, are open along one side. Green sepals are narrow and hairy. The style has an enlarged pink stigma. When not in flower the plant resembles *L. tubiflora* (which has a similar habit and scarlet or cream to yellow tubular flowers). The fruit is an elongated capsule 4-5 mm in height containing a few brown ridged seeds and remains hidden among the leaves. The species name refers to the circular cushion shape of the mature plant.

Flowering Period: Late October to January.

Distribution and Habitat in the Narrogin District

Occurs from north east of Corrigin southwards to the Dongolocking area, south of Wickepin and westwards to the eastern jarrah forest. It grows on deep, white sand, occurring high in the landscape. At the Corrigin site it occurs on deep white sand above a major salt seepage area. It prefers to grow in open situations without competition from other native species.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|-----------------------|-------------|-------|-------------|---------------|---|
| 1 Ward | 18/10/94 | Wic | PP | 30 | Plants mainly suppressed and dying. |
| 2 Dongolocking | 22/09/92 | Wic | NR | 4 | 50 plants in 1982 |
| 3 Dongolocking | 31/10/86 | Wic | PP | 0 | 1 in 1982. |
| 4 A+B Dongolocking | 22/09/92 | Wic | NR+PP | 0 | 91 plants in 1982. Few in PP. |
| 5 Dongolocking | 22/09/92 | Wic | NR | 0 | 16 plants in 1983. |
| 6 Dongolocking | 22/09/92 | Wic | NR | 2 | 200 plants in 1982. Surviving plants on internal break. |
| 7 Dongolocking | 22/09/92 | Wic | NR | 0 | 750 plants in 1982. |
| 8 Dongolocking | 22/09/92 | Wic | NR | 0 | 30 plants in 1982. |
| 12 A+B Harrismith | 24/02/94 | Wic | RWR | 3 | Declining population. |
| 14 Dongolocking | 03/12/92 | Wic | NR | 24 | All on firebreak. |

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|------------------|-------------|-------|-------------|---------------|--|
| 17 Dongolocking | 18/12/92 | Wic | NR | 2 | On Firebreak. |
| 18 Stone | 06/09/93 | Cor | PP | 260 | Fenced. Popn may decline if soil is not disturbed. |
| 20B Taylor | 18/11/93 | Wic | PP | 30 | Fenced. May decline. |
| 20A Taylor | 18/11/93 | Wic | PP | 6 | Fenced. May decline. |
| 22 Robinson Road | 11/93 | Wic | RVS | 3 | Unknown. |

Wic Shire of Wickepin

Cor Shire of Corrigin

* population only known as Herbarium record.

Response to Disturbance

A disturbance opportunist, indicated by growing on firebreaks, road verges and fenced off farmland. Appears to regenerate by rootstock and seed following a fire.

Seed is relatively long lived in the soil, indicated by the regeneration in sandy sites on farms following fencing.

Weeds may suppress regeneration.

Susceptible to grazing animals including feral, native and domestic. Heavy grazing by kangaroos and rabbits evident at some localities with rabbits using plants as a squat for droppings.

Susceptibility to fungal disease and salinity is unknown.

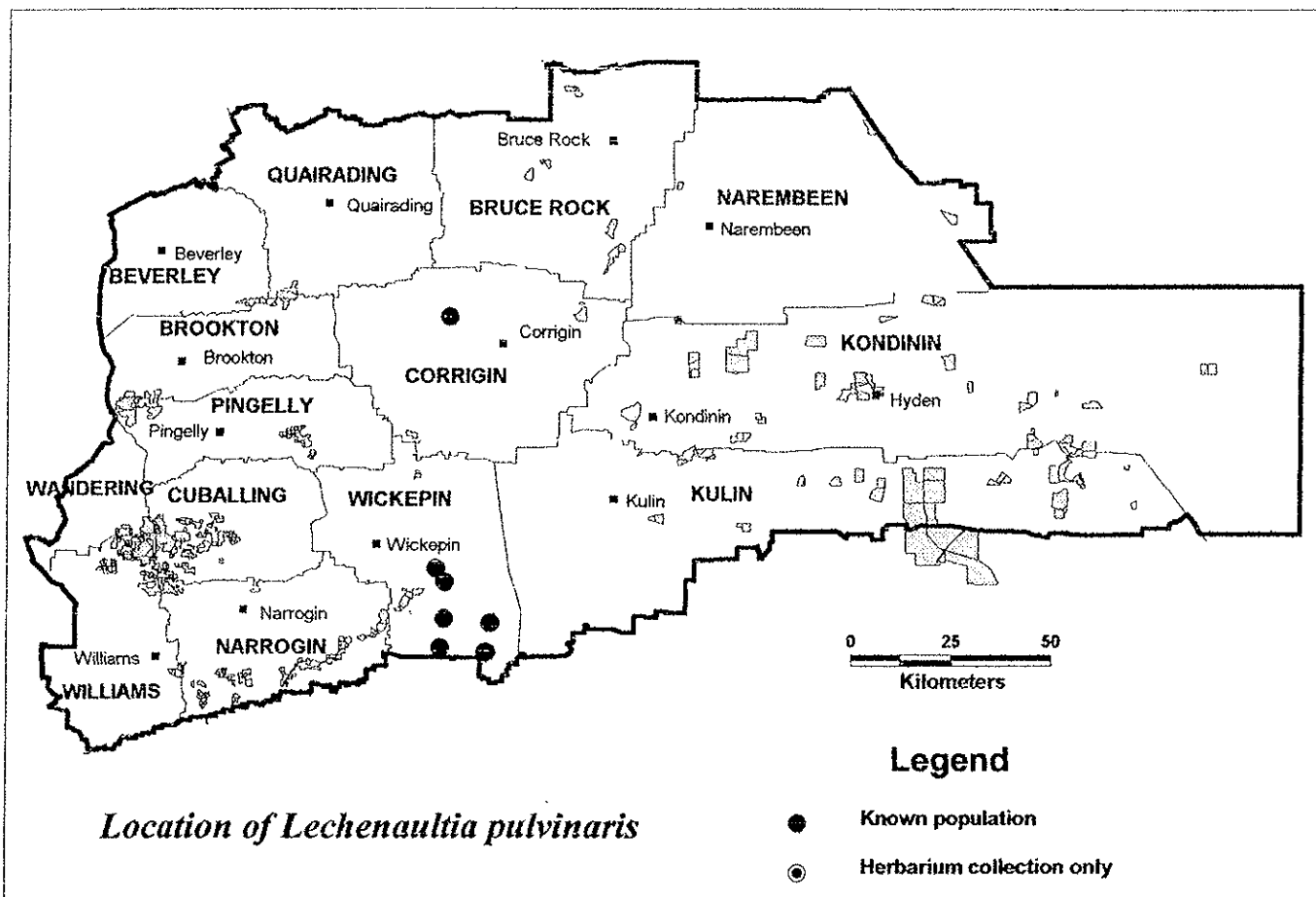
Management Requirements

- Sites inspected prior to 1990 should be re-surveyed, recording population numbers and condition.
- Follow up monitoring of all populations every two years.
- Proposal to burn number 7 in Autumn 1994 to be implemented with follow up surveys of regeneration.
- Firebreaks within populations number 2,14 and 16 to be maintained at no less than five-yearly intervals.
- Maintain plants in cultivation by cuttings at Kings Park Botanic Gardens.
- Population number 1 may require veldt grass control to prevent further incursion into the population.

Research Requirements

- Set up a monitoring quadrant at population number 7 following the experimental research burn.
- Set up an annual monitoring programme of population number 15. Investigate disturbance techniques within this population to provide data for future regeneration and enhancement of populations.
- Survey for new populations on conservation reserves and other remnant vegetation at similar sites, especially on sandy sites above saline seeps within its known range.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References Gardner (1964), Morrison (1987), Patrick (1983), Rye and Hopper (1981), Kelly et al (1990), Carolin (1992).



Leucopogon marginatus W.V. Fitzg.

EPACRIDACEAE

An erect shrub to 45-60 cm tall. The leaves are alternate, erect, closely pressed together, concave, with the margins often clasping the branches, leaves crowd or overlap each other on the terminal shoots, and are marked by conspicuous parallel lines or grooves. They are egg shaped to lance shaped, shortly pointed, nearly sessile, the margins bordered by a crisp or undulate membrane. 1-3 flowered peduncles occur in the upper axils, usually shorter than the leaves. The corolla is white; the tubes slightly exceeding the calyx; the lobes are shorter than the tube, ending in acute smooth tips. Filaments are hardly flattened; anthers attached near the top, oblong shaped, without sterile tips. The ovary is longitudinally streaked, smooth, 5 celled. The style is barely exerted and the stigma is enlarged at the tip. The species name refers to the thickened margins of the leaves.

Flowering Period: July to September.

Distribution and Habitat in the Narrogin District

The type locality is from the Arrino sandplains in the Moora District. Recent numerous collections have been made from Holleton to north of Mount Holland and south to Hatters Hill, occurring in sand or gravel associated with heath or scrub heath vegetation.

Conservation Status

Current: Declared Rare Flora Presumed extinct

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|---------------|-------------|-------|-------------|---------------|---------------------------------|
| Not confirmed | 22/07/92 | Kon | VCL | 80+ | Some disturbance. Native rocks. |

Kon Shire of Kondinin
* population known only as Herbarium record.

Response to Disturbance

Response to all environmental factors are unknown.

Susceptibility to *Phytophthora* Dieback

Not Known.

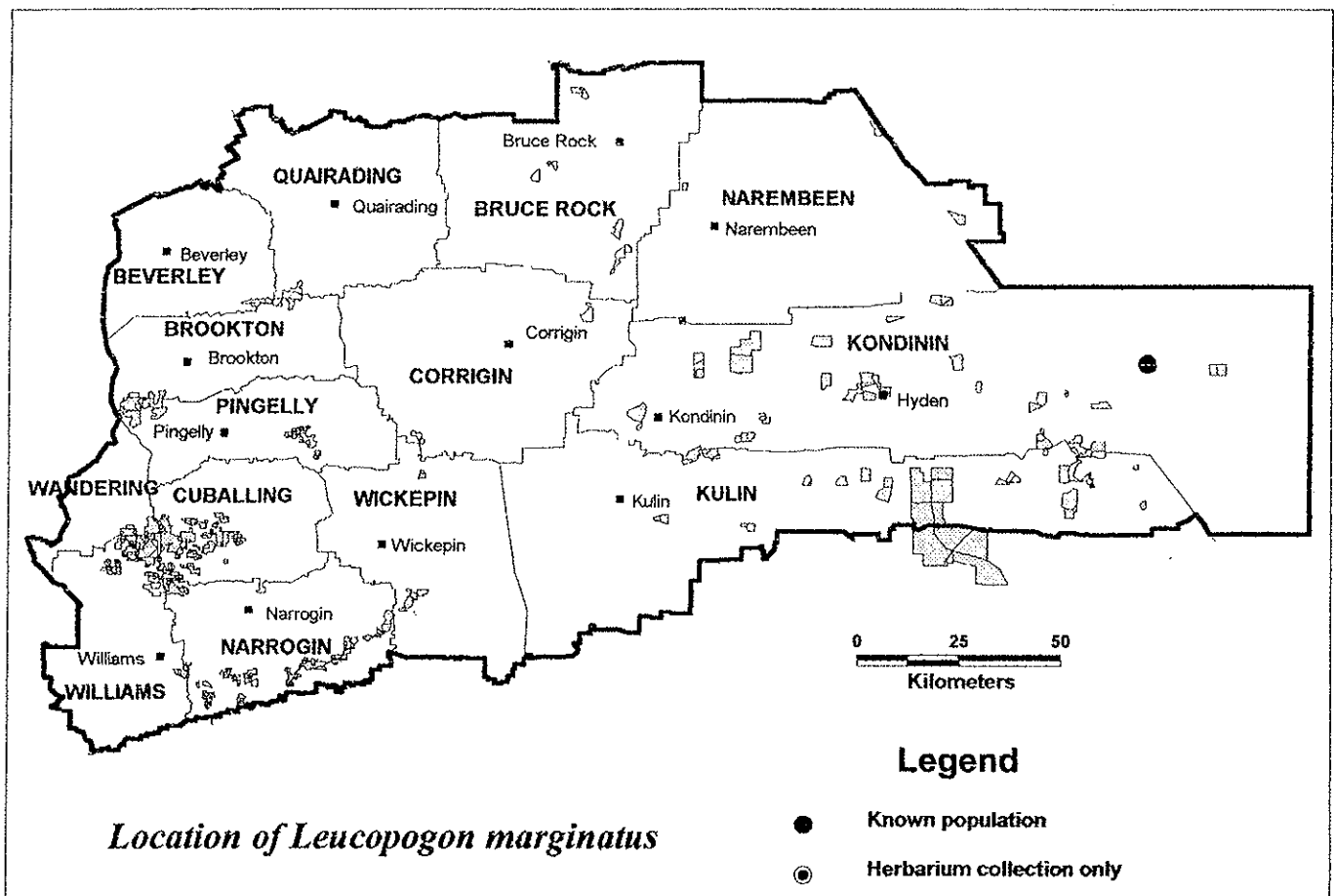
Management Requirements

- Nil required until recent collections are confirmed. If confirmed species protection status may be considered for change to Priority 3.

Research Requirements

- Confirm all recent Herbarium collections.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium

References Blackall and Grieve (1981), Fitzgerald (1904).



Granite Myriophyllum.

An annual aquatic herb 15-30 cm tall with weak 1-2 mm diameter stems, sparingly branched, mainly at the base. Leaves are alternate, linear to oblanceolate, 6-7 mm long and 0.8-0.9 mm wide, pointed to rounded ends, margins entire, monomorphic. Emergent leaves are longer and broader than those submerged. Inflorescence is a simple spike with unisexual flowers borne singly in the axils of the upper leaves. Male and female flowers occur on separate stems of the same plant, or on different plants, or together on the same stem with male flowers above the female flowers. Male and female flowers 4-merous and sessile. Male flowers: sepals absent, petals 2.9-3 mm long persistent, white, stamens 8. Female flowers: sepals and petals absent, ovary 4-compartments, styles club shaped, erect, stigmas pale. Fruit is sessile, yellow-brown to red-brown in colour.

Flowering Period: August, with fruiting from October to December.

Distribution and Habitat in the Narrogin District

Known from one population in the Narrogin District 50 kilometres east of Narembeen. It is also known to occur in the Goldfields Region and the Esperance District. It may be found confined to ephemeral rock pools on granite outcrops. Plants die each year as the rock pools dry during summer. The plants re-establish in the pool each year by germination from seed. They are strictly aquatic with weak stems that collapse when stranded.

Conservation Status

Current: Declared Rare Flora[#]

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|------------|-------------|-------|-------------|---------------|-----------------|
| 5 Twine | 1990 | Nar | WAR | 6000+ | Good condition. |

Nar Shire of Narembeen
* population known only as Herbarium record

Response to Disturbance

This species is very specialised in its habitat requirements and is always associated with fragile granite rock communities. Suitable habitats are usually limited in size.

Response to environmental factors and disturbance is unknown. Aquatic weed invasion, pollution of rock pools by fertiliser and chemical drift may affect the survival of individual populations. Human impact through recreational and vehicular activities near these populations may cause population damage and decline.

[#] now Priority 4 (updated at December 1999)

Susceptibility to *Phytophthora* Dieback

Not Known.

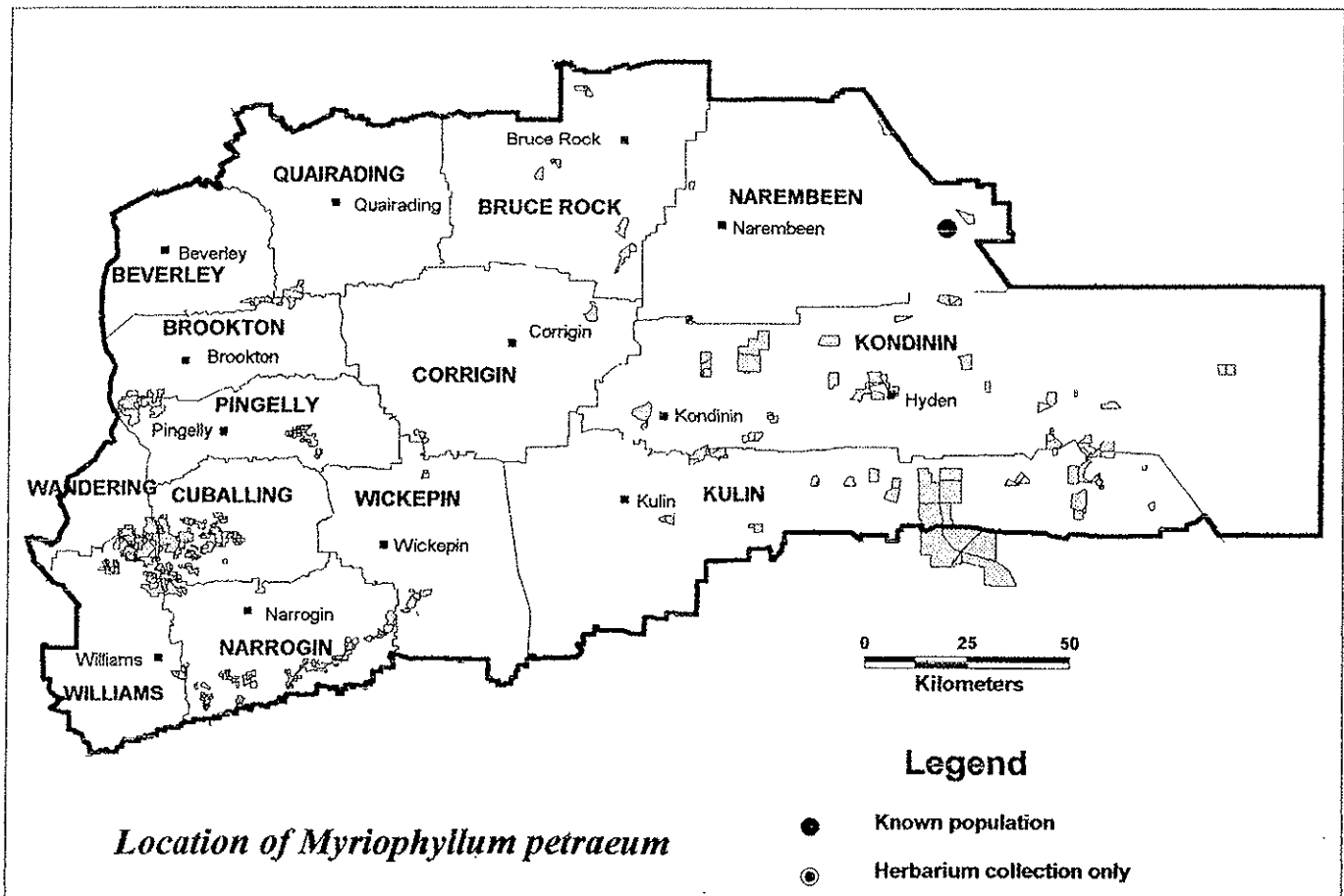
Management Requirements

- Vesting of the reserve containing population number 5 to nature reserve status should be considered.
- Preparation of management guidelines to protect population number 5 from human based activities should be completed.
- Population number 5 to be inspected occasionally during September to monitor population condition.

Research Requirements

- This species may be more common than first thought. Therefore, further surveys should be completed on similar granite rock sites to extend the known populations and to provide recommendations for its long term protection status.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References Orchard (1985) and (1990), Hopper *et al.*(1990).



Pultenaea pauciflora M. Scott.

PAPILIONACEAE

Narrogin Pea

A pea flowering shrub to 0.8 metres tall, abundantly branched and mostly with the branchlets in false-whorls. The branches at first are grey, soon becoming brown, the younger ones with fine whitish - grey hairs. Leaves are linear-lanceolate or sickle shaped, narrowed at the base and with a sharp point 1.5-2 mm long at the tip, the leaf blade 15-17 mm long and 1.7 mm wide, flat or slightly thickened. The colour of the leaf is green and it is hairless. The younger leaves are greyish-green with spreading white hairs 2 mm long. Flowers are large, pea like, yellow, borne singularly or in pairs in the leaf axils at the end of the branchlets. Individual flowers have a densely-hairy calyx which is five lobed with the lobes the same length as the calyx tube. The calyx is subtended by two reddish-brown bracteoles 3-5 mm long which arise near its base. The standard petal is 10 mm in diameter and has a 2.5 mm claw at the base, the wing petals are 10 mm long and 3.5 mm wide whilst the keel petal is also about 10 mm long and is about 4.5 mm wide. Fruit is an egg shaped pod about 9 mm long and 4.5 mm wide, covered with long hairs. The species name refers to the small number of flowers in each flower cluster.

Flowering Period: October to December.

Distribution and Habitat in the Narrogin District

Known from two localities, from within Narrogin townsite, west to near the Narrogin Agricultural College, and from the Lupton State Forest north-west of the Wandering townsite. It may be found growing in white sand over laterite soils in association with open woodlands of *Corymbia calophylla* and *Dryandra sessilis*.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|---------------------|-------------|-------|-------------|---------------|--|
| 1 A+B Narrogin West | 14/07/92 | Nar | REC+RV M | 77 | Mostly old plants, some seedlings appeared recently. |
| 2 Narrogin | 14/07/92 | Nar | CALM | 19 | Old disturbed site. |
| 3 Narrogin | 01/11/93 | Nar | WAR | 1 | On gravel pit. Burnt 1991. Re-sprouted. |
| 4 Narrogin | 16/11/93 | Nar | WAR | 3 | Old plants within bushland. |

Nar Shire of Narrogin
* population known only as Herbarium record

Response To Disturbance

Mature plants appear to be able to re-sprout from rootstock or lignotuber. The single plant at Population number 3 was burnt in 1991.

Fire would assist in cracking the hard seed coat which would then allow germination.

Weeds may restrict germination and establishment of seedlings.

Effect of grazing unknown, however likely to re-sprout following grazing.

Viable seed produced in low numbers following flowering.

Susceptibility to *Phytophthora* Dieback

Not known.

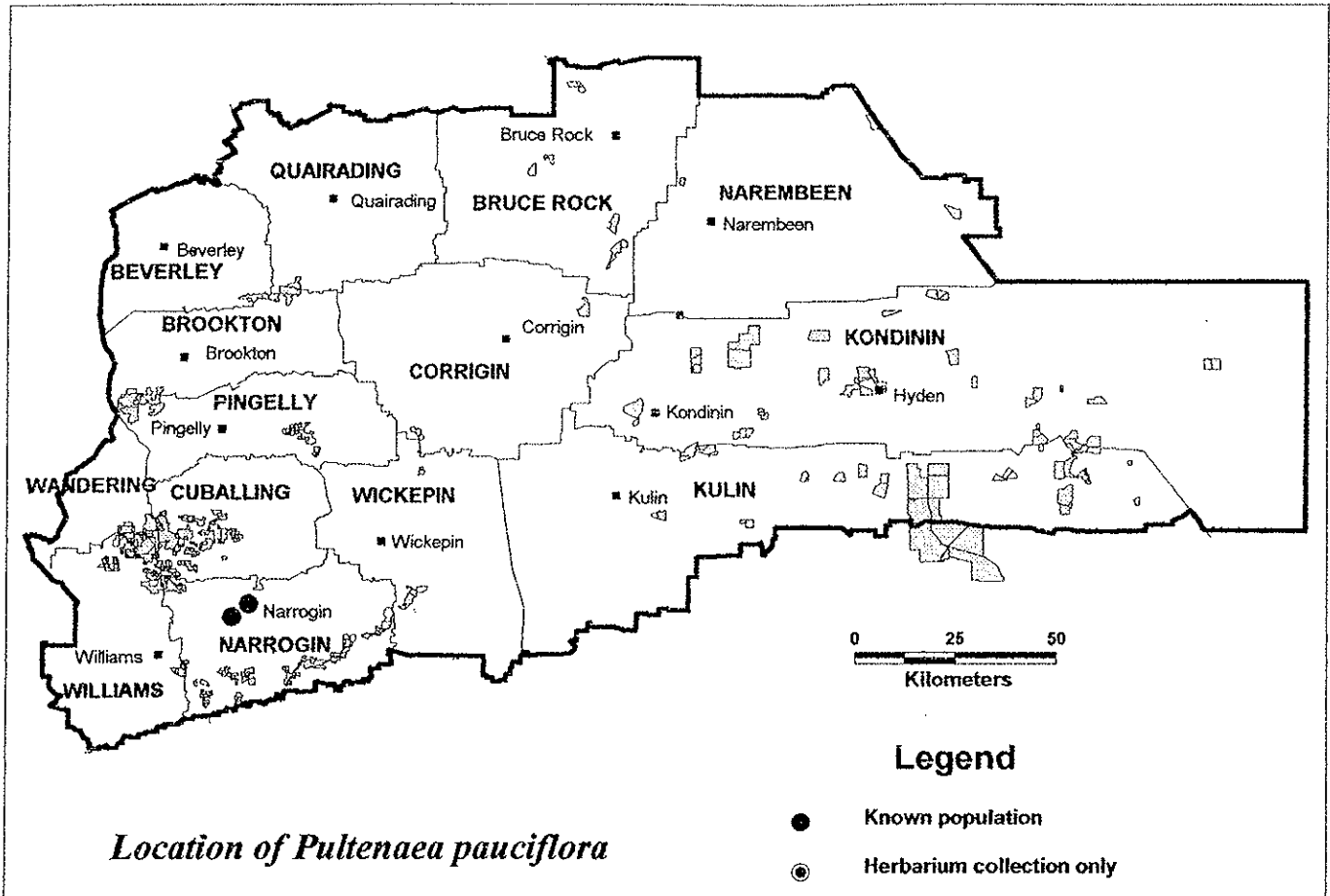
Management Requirements

- Maintain roadside markers at population number 1.
- Monitor known populations on a two yearly basis.

Research Requirements

- Continue to raise seedlings on an experimental basis at CALM Narrogin Plant Nursery and continue translocation studies at population number 1.
- Relationship to fire on seedling germination and re-sprouting requires investigation.
- Study the relationship between flower pollinators and seed viability.
- Conduct surveys for new populations within the known range. Survey other similar sites in bush areas within a 30 kilometre radius of current populations to extend the known range.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References Scott (1914), Leigh, Boden and Briggs (1984).



Underground Orchid.

A underground herb living on dead and decaying organic matter with a short horizontal stem and longer vertical shoots bearing the terminal flower heads. Flower heads are comprised of 50-100 flowers surrounded by 6-12 large spreading bracts 1-3 cm long and 5-10 mm wide. Small flowers are 6 mm long and 5 mm wide, deep purple-red, arranged in spiral rows facing the centre of the heads. The species name refers to the underground flowering habit. Apart from its flowers, the orchid is uniformly white and if any part is cut it produces a faint formalin-like smell. Occasionally the tips of the floral bracts protrude through the leaf litter, deposited by *Melaleuca uncinata* (Broom Bush) leaving a tiny opening. Otherwise flowering occurs below the ground surface. Seeds mature in November- December but seed set appears to be low. The fruits are succulent.

Flowering Period: May to June.

Distribution and Habitat in the Narrogin District

The current known geographic range of this species is about 500 kilometres, from north east of Perth to near Esperance. In the Narrogin District this orchid is known from the Corrigin Shire. It may be found with and growing alongside *M. uncinata*. It always occurs within about 1.5 metres of the *Melaleuca* lignotuber. Its preferred habitat is brown sandy clay soils in a tall open shrubland of several mallee species with an understorey dominated by *M. uncinata*. It may also occur in open heath. Being subterranean, *R. gardneri* is unable to derive its energy by photosynthesis. Instead it subsists on the decaying stumps of *M. uncinata*. A fungus (*Rhizoctonia*) that occurs in the outermost cells of the Underground Orchid and links it to the *Melaleuca* stump is probably essential for the orchid's specialised lifestyle.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|------------|-------------|-------|-------------|---------------|-------------------------|
| 1 Babakin | 05/91 | Cor | NR | ? | Plants present in 1991 |
| 2 Bees | 05/93 | Cor | NR | ? | No plants seen in 1993. |
| 6 Kunjin | 07/92 | Cor | VCL | 1 | Unknown |

Cor Shire of Corrigin
* population known only as Herbarium record

Response to Disturbance

Response to fire is unknown.

Damage to its surrounding habitat through soil disturbance, clearing of vegetation and weed invasion is detrimental to this species' survival.

The main pollinating agent is unknown, although tiny wasps, gnats, ants and termites have been seen visiting the plant.

Seed set is improved when the leaf litter is removed and the flower heads exposed. It is possible that seed dispersal occurs when marsupials eating the succulent fruit pass seed out in their faeces in adjacent areas.

Susceptibility to *Phytophthora* Dieback

Not Known.

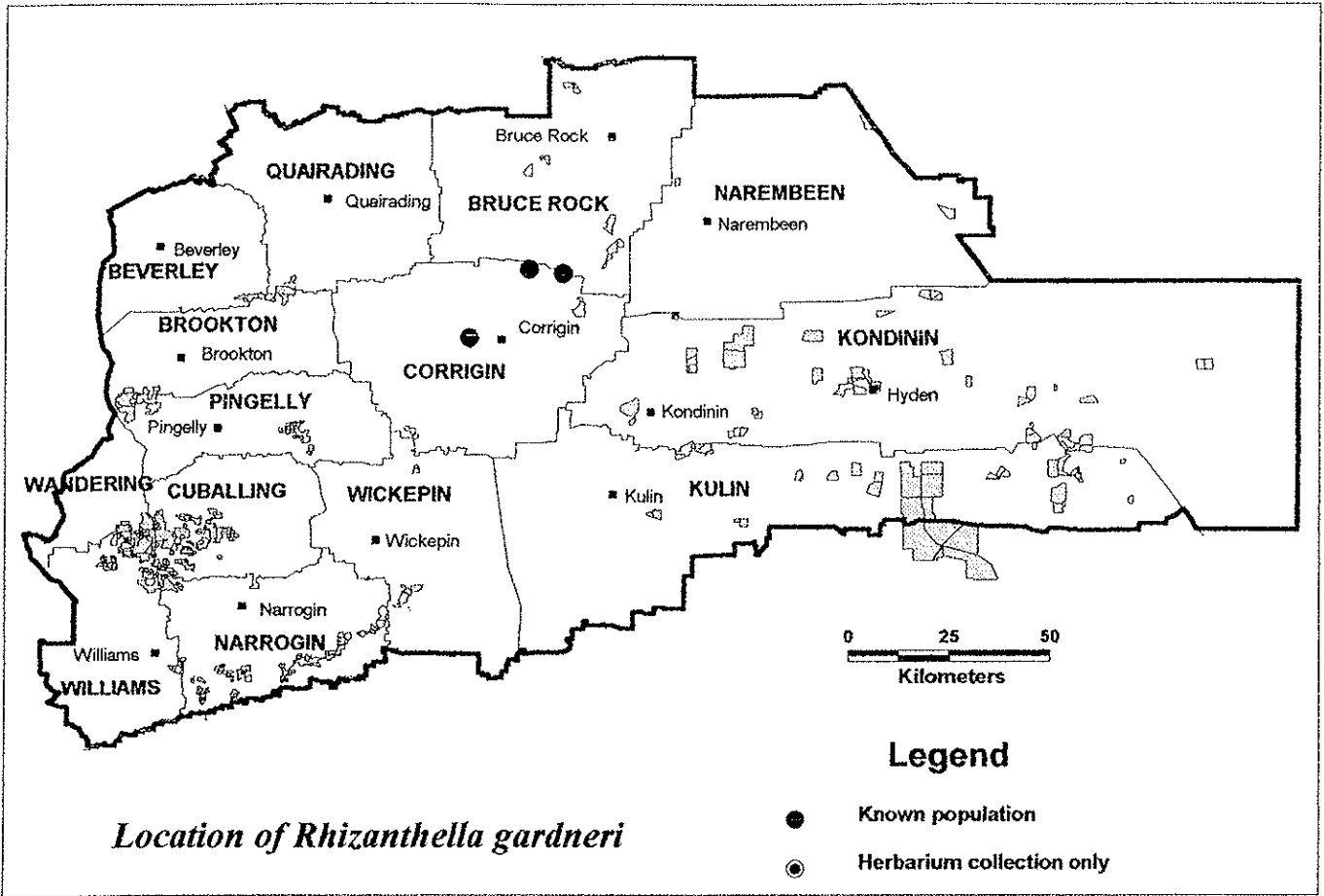
Management Requirements

- Monitor known populations every two years for any change in habitat and ensure the long term protection of the species in the wild.
- The unvested reserve where population number 6 occurs, requires vesting as a Nature Reserve.
- Within known populations endeavour to confirm location of plants. (About 10 person-hours are required to locate one plant in known populations, when surveying for the species).

Research Requirements

- New population survey work needs to target likely new sites, initially within close proximity to known populations to increase the known plant number.
- Research fertilisation and seed dispersal requirements.
- The relationship between the orchid and *Melaleuca uncinata* and its morphology needs further research.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References Rye (1981), Rogers (1928), George (1980), Hoffmann & Brown (1992), Cairstairs (1994).



Thelymitra stellata Lindl.

ORCHIDACEAE

Star Sun Orchid.

A "Sun orchid" to 25 cm tall. Unlike most orchid species which have symmetrical flowers with similar petals, sepals, and a simple, unmodified labellum. As many as six flowers 2.5-3 cm in diameter occur on a robust stem growing to 50 cm in height. Plants known in the Narrogin District tend to have fewer flowers and smaller stature. They are predominantly golden-brown in colour, sometimes yellow with orange stripes on the petals and sepals. The column hood is deeply fringed on either side and usually bright orange in colour. The central portion is woolly with dense nipple-like glands. A single, lily-like leaf, up to 9 cm long and 4 cm wide, clasps the stem at the base and is usually shrivelled by the time of flowering. The stem dies back below ground level after seed set. Flowers remain closed during cool overcast weather. The species name refers to the appearance of the flower. This species is very similar to *T. benthamiana* (Leopard orchid) and *T. jacksonii*, but can be distinguished by its smaller leaves and flowers, and less blotched more uniformly golden-brown sepals and petals.

Flowering Period: October- November. (Early November in the Narrogin District).

Distribution and Habitat in the Narrogin District

Known from one population in the Narrogin District, from near Corrigin, occurring on reddish brown gravelly loam over laterite in thickets of *Allocasuarina campestris*. Occurs in very isolated small populations of two to three individuals. Also known from a number of scattered populations along the Darling Scarp and one population in the Katanning District.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|-------------|-------------|-------|-------------|---------------|--------------|
| 20 Corrigin | 05/11/93 | Cor | SR+WAR | 5 | Undisturbed. |

Cor Shire of Corrigin
* population known only as Herbarium record.

Response to Disturbance

Plants killed if burnt when above-ground parts are present (August -December).
A succulent plant susceptible to grazing.
Weeds suppress growth.
Susceptibility to weeds and canopy cover is unknown.

Susceptibility to *Phytophthora* Dieback

Not known.

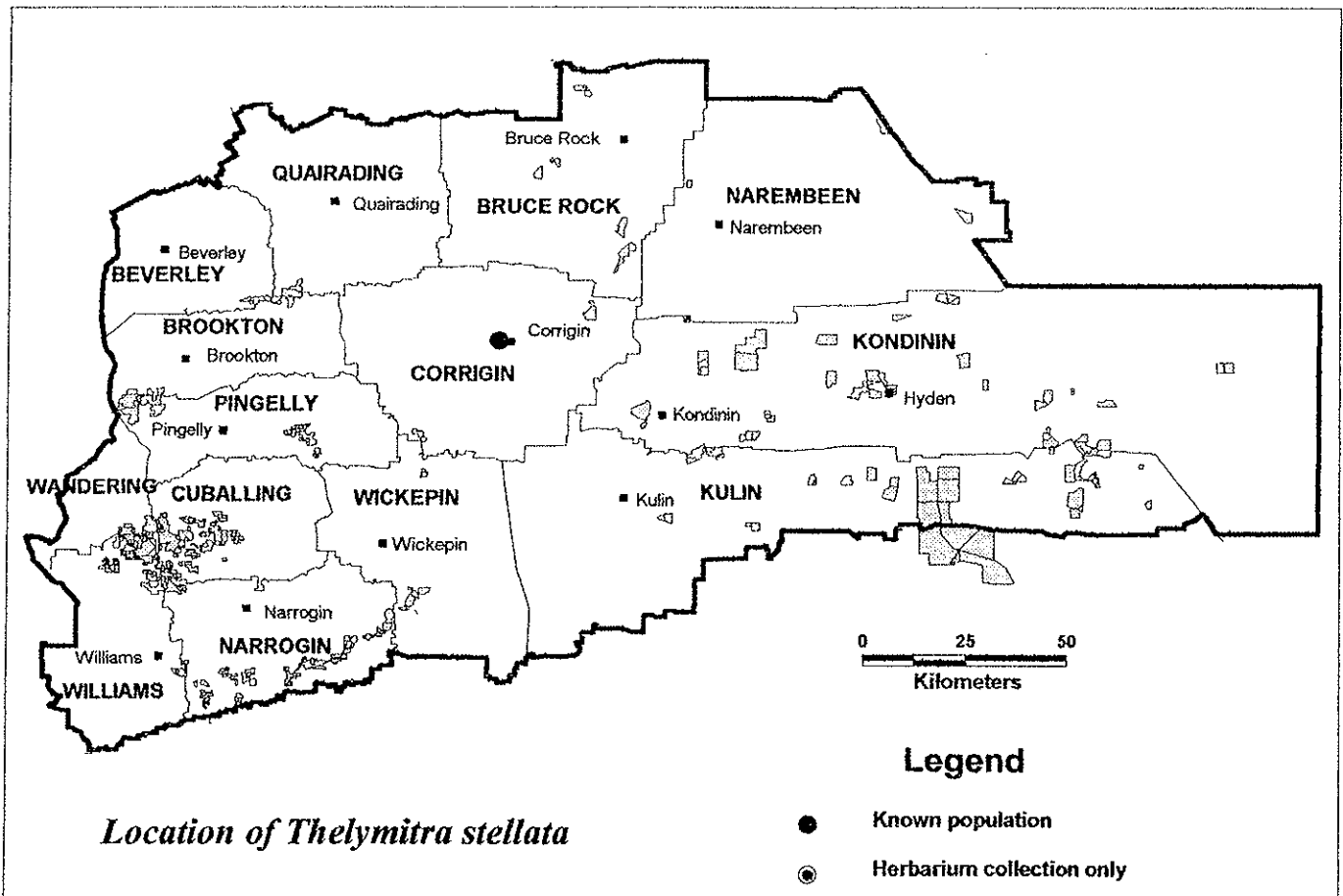
Management Requirements

- Liaise with the Shire of Corrigin concerning the long term protection of this population site.
- Inspect population on an annual basis in early November.

Research Requirements

- Survey for more populations within the adjacent area in early November.
- Investigate pollination biology.

References Bentham (1863), Hoffman and Brown (1992), George (1971), Patrick and Hopper (1982).



Hill Thomasia

An upright shrub to 1 metre high, with hairy branches. The flowers are purplish-pink to maroon, arranged in densely-hairy 3-5 flowered racemes which are borne on long peduncles. Individual almost bell shaped flowers are borne on pedicels about 6 mm long and have 5 minute hairy petals and a hairy calyx about 12 mm in diameter which is lobed to about half its length. The sepals are broadly thickened and have very thin wavy edges and the stamens and staminodes are fused at the base into a cup as long as the ovary. Leaves are green on both sides and covered with star shaped hairs. The leaf margins are entire or slightly wavy to toothed. Leaves are stalked, egg shaped to broadly-oblong and with a very blunt tip, mostly less than 2.5 cm long and 8-10 cm wide. The fruit capsule comprises three chambers containing several seeds in each chamber. The species name refers to its natural habitat which appears to be up-land sites.

Flowering Period: From September to October.

Distribution and Habitat in the Narrogin District

Occurs on a range of different soil types from laterite red clay -loam to granitic red-brown clayey loam soils, from near Brookton to the Boyagin area. Appears to favour upland sites high in the landscape. Usually found in vegetation associated with *Eucalyptus wandoo*, *Corymbia calophylla* and *Allocasuarina huegeliana*. Favours moisture gaining sites when associated with granitic soils. Appears to favour previously disturbed sites germinating readily from seed when conditions are favourable.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|------------------|-------------|-------|----------------|---------------|------------------------------|
| 2 Boyagin | ? | Bro | NR | ? | No population details. |
| 4 Chittleborough | 10/10/94 | Bro | PP+WAR+RV S | 50+ | PP recently fenced. |
| 5 Boyagin | 02/09/94 | Pin | NR+PP | 40+ | 200 in 1992. PP area fenced. |
| 6 Boyagin | 16/09/92 | Pin | NR | 7 | On disturbed site. |
| 7 Boyagin | 16/09/92 | Bro | NR | 50 | Base of granite rock. |
| 8 Boyagin | 16/09/92 | Pin | NR | 20 | Near rec site. |
| 9 Boyagin | 17/12/92 | Pin | NR | 30 | Disturbed site. |
| 10 Boyagin | 17/12/92 | Pin | NR | 30 | Good. Healthy |

Bro Shire of Brookton

Pin Shire of Pingelly

* population known only as Herbarium record

Response to Disturbance

Response to fire is unknown. Effects from weeds and disease are unknown, however weeds may suppress germinating seedlings.

Plants are affected by grazing, but quickly re-sprout when grazing animals are removed.

Favours a range of different dry and moist soil types.

Appears to germinate readily following disturbance of the soil.

Germinates readily from seed.

Susceptibility to *Phytophthora* Dieback

Not known.

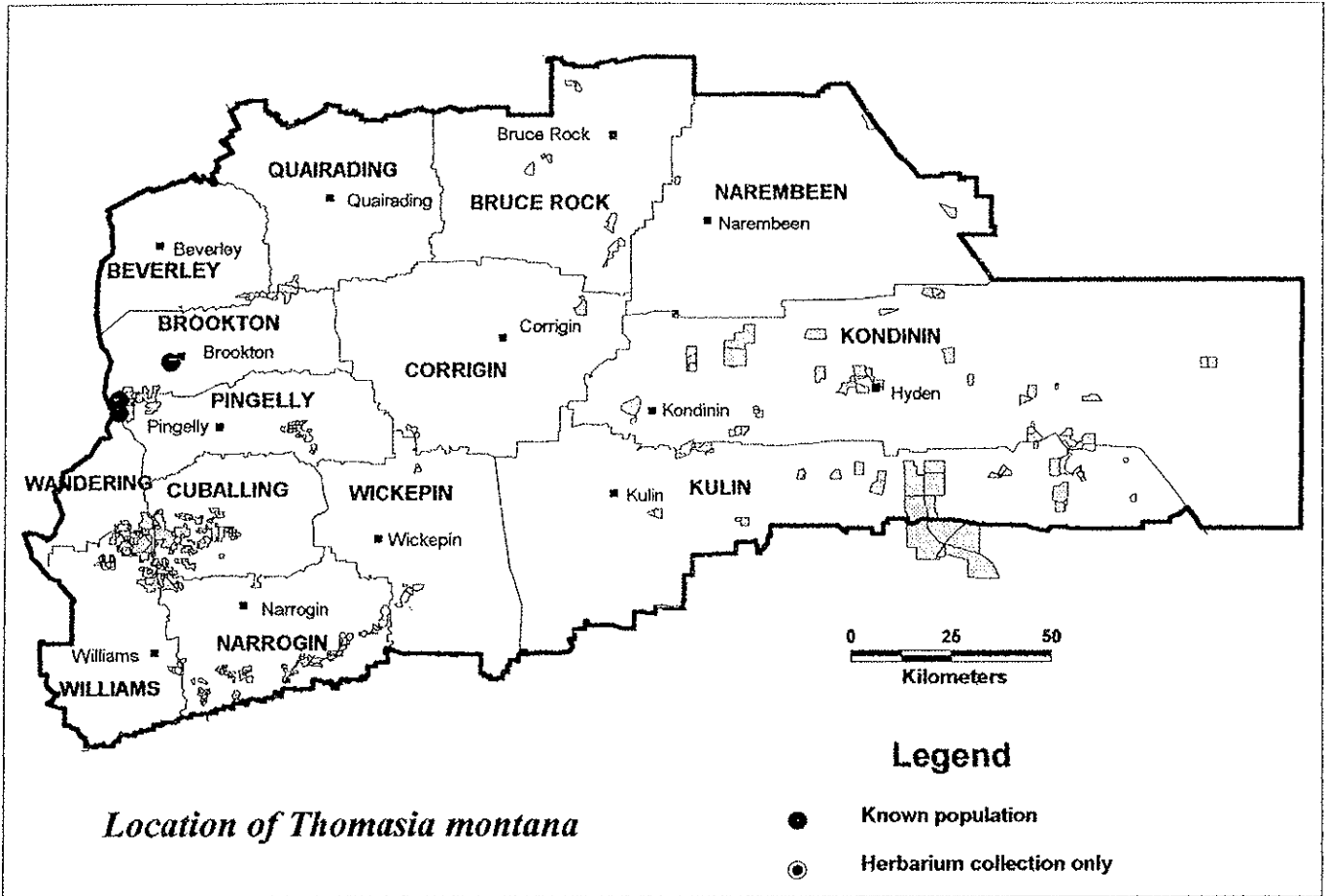
Management Requirements

- Population number 4 requires fencing, and roadside markers in consultation with the Shire of Brookton and the land owner.
- Population numbers 5,6,7,9 and 10 require roadside marker pegs installed and maintained.
- Population number 8 needs to be protected from all recreational activities.
- All known populations require an inspection occasionally during the flowering season.

Research Requirements

- Survey to locate population 2 and additional populations in similar sites on conservation reserves in the western portion of the Brookton and Pingelly Shire.
- The relationship of disturbance and germination of this species needs further investigation.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References Bentham (1863), Leigh, Boden and Briggs (1984), Hopper *et al.* (1990).



Verticordia fimbrilepis Turcz. subsp. *fimbrilepis*.

MYRTACEAE

Shy Feather flower.

An erect openly branched feather flowering shrub to 60 cm tall without a lignotuber and with one basal stem. The stem leaves are linear shaped, slightly tapering, blunt but with a pointed tip, 2-5 mm long. The floral leaves are oblong to narrowly egg shaped, otherwise similar to the stem leaves. Flowers are erect, occurring in rounded flat clusters. The pedicles are 2-15 mm long. The bracteoles obscurely ridged and persistent. The 1.4-1.6 mm long hypanthium is broadly top shaped, 10 ribbed, slightly warty, smooth; reflexed and appendages absent. The 2.5-3 mm long, pink petals are egg shaped, coarsely fringed along the margins and spreading. 3-3.5 mm long, spreading sepals are pink; lobes 5-7, fringed along the margins. Auricles are absent.

There are two subspecies; subsp. *fimbrilepis* and subsp. *australis*. Subsp. *fimbrilepis* is distinguished by the pedicels 2-4 mm long; petal lamina 1.3-1.5 mm wide; staminodes with a long apical cilium. The species name refers to the staminodes being petal like and fringed.

Flowering Period: November to December.

Distribution and Habitat in the Narrogin District

Occurs within the western wheatbelt from near Brookton south to the Woodanilling area. In the Narrogin District it occurs in open heath sites and narrow degraded road verges from east of Narrogin to Aldersyde. It grows on sandy loam over gravel and is found associated with *Verticordia densiflora*, *V. brachypoda*, *V. pennigera*, *Hakea incrassata*, *Banksia sphaerocarpa* and *Allocasuarina huegeliana*.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|-------------|---|-------|-------------|---------------|----------------------------|
| 4 Jingaring | 31/03/94 | Pin | RVS | ? | Weeds and Graded March 94. |
| 6 Narrogin | 24/12/93 | Nar | RVS | 17 | Undisturbed. |
| 7 Jingaring | 15/12/92 | Pin | RVS | 10 | On narrow road verge. |
| Pin | Shire of Pingelly | | | | |
| Nar | Shire of Narrogin | | | | |
| * | population known only as Herbarium record | | | | |

Response to Disturbance

Response to fire is unknown.

Adult plants killed by soil disturbance, however low levels of seedling regeneration have been recorded at some sites.

Veldt grass and other grasses occur at most sites and may affect survival.

Susceptibility to disease and response to grazing and salinity are unknown.

Susceptibility to *Phytophthora Dieback*

Not Known.

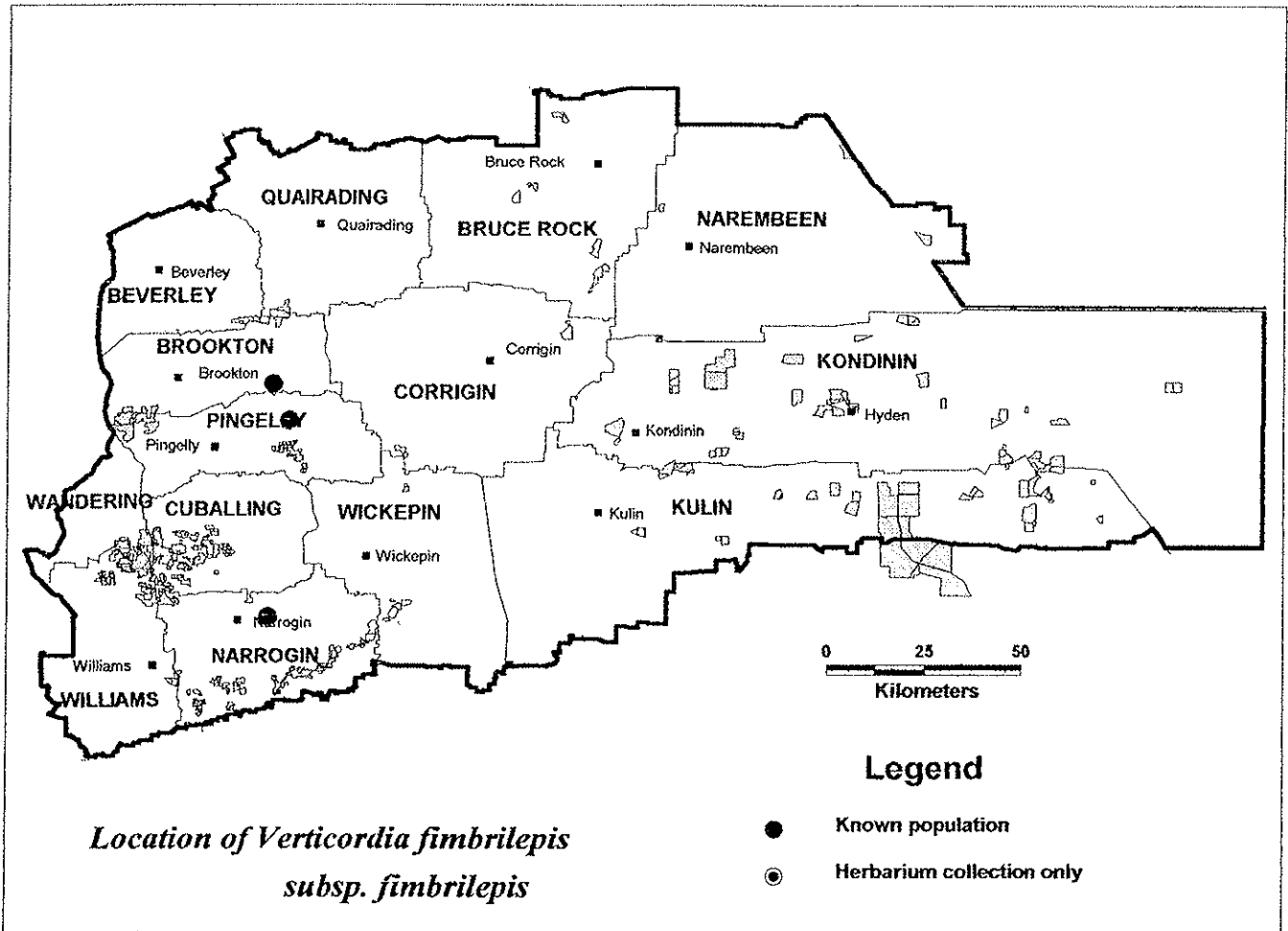
Management Requirements

- Liaise with relevant Shire Councils and adjacent landowners to ensure that populations remain protected from any possible disturbance.
- Inspect populations on an annual basis during the flowering period recording plant numbers and condition.
- Ensure roadside markers remain in position.
- Accurately map individual plants occurring within population number 4, 6 and 7 for future monitoring.

Research Requirements

- Survey for additional populations in similar vegetation associations within the Narrogin District.
- Monitor all populations on an annual basis.
- Establish and maintain in cultivation.
- Investigate response to disturbance, and fire regimes.
- Use of selective herbicides on weed control and enhancement of populations.
- Investigate re-establishment techniques within populations.
- Re-survey population number 4 following recent disturbance and monitor for germination of seedlings.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References George A.S. (1991), Hopper *et al.*(1990), Bentham (1867).



Verticordia staminosa subsp. *cylindracea*

A.S George. var. *cylindracea*

MYRTACEAE

Wongan Feather Flower.

A small upright or columnar shrub to 1 metre tall. It may be distinguished by its solitary flowers with long protruding stamens which are bright red with yellow tips. Below these are yellow, very feathery sepals and two bright red persistent bracts. Differs from *V. staminosa* subsp. *staminosa* in the smaller flowers, the longer staminal tube, and the staminodes inserted between the staminal filaments. Sepals are 5-6 mm long, stamens 6-7 mm long, united for 3 mm, staminodes inserted between the stamens, the free part is 1 mm long, with a blunt or rounded end. There are two varieties of this subspecies, which differ in their habit but occur in the same area. *V. staminosa* subsp. *cylindracea* var. *erecta* is more erect to 1 metre tall.

Flowering Period: July - October.

Distribution and Habitat in the Narrogin District

Occurs on several granitic outcrops, on shallow soils from Pingaring to east of Newdegate.

Conservation Status

Current: Declared Rare Flora

Populations in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of Plants | Condition |
|-------------|-------------|-------|-------------|---------------|---|
| 2 Pingaring | 23/06/93 | Kul | WAR | 26 | Death of 8 plants since 1988. No germinants |

Kul Shire of Kulin
* population known only as Herbarium record

Response to Disturbance

Effects of fire, weeds, and disease are unknown. Survival of plants may be affected by long periods of drought during summer. This may be due to the granite rock and shallow soil habitat. Germinants may be affected by grazing rabbits.

Susceptibility to *Phytophthora* Dieback

Not Known.

Management Requirements

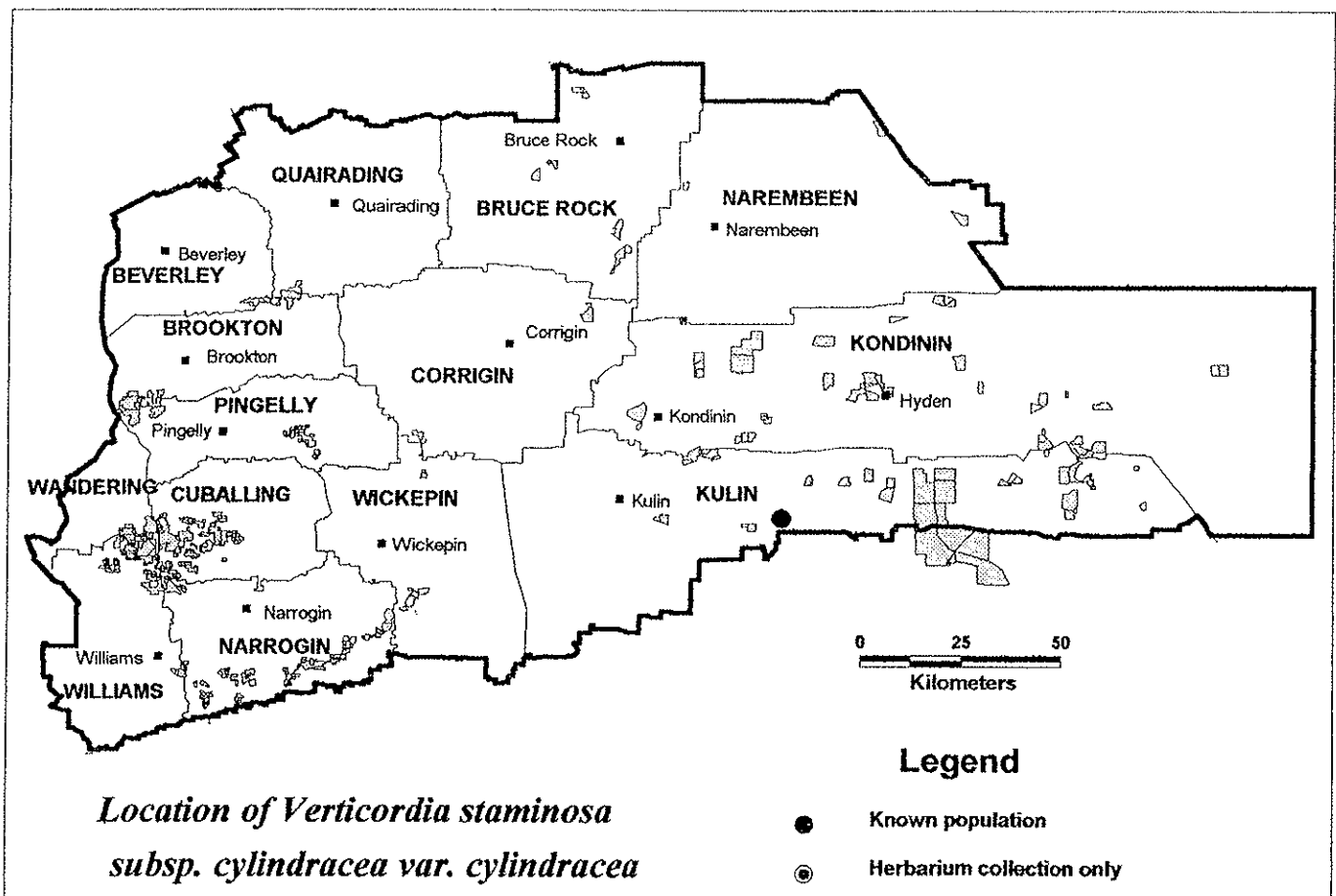
For Population number 2 only:

- Reserve should be considered for vesting as a Nature Reserve.
- Inspect population annually during the flowering season. Record plant numbers and condition.
- Monitor and control rabbits numbers if necessary.

Research Requirements

- Survey opportunistically to locate possible new populations.
- Maintain cutting material at Kings Park and Botanic Gardens.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the W.A. Herbarium.

References George (1991).



PART THREE : PRIORITY FLORA IN THE NARROGIN DISTRICT

The taxa treated in this section are those on CALM's priority list as poorly known flora (P1, P2, and P3). This section describes CALM's Priority Flora List (October 1995) for the Narrogin District. The priority categories are outlined in part 1.4 of this Management Program. The treatments follow the format in Part 2 but generally do not include detailed recommendations for management because in most cases population details are unknown. Most recommendations include a requirement for further surveys.

Priority One, Two and Three taxa require further surveys to determine their conservation status as they do not meet the requirement for gazettal as Declared Rare Flora. They may be added to the Declared Rare Flora Schedule if they prove to be rare or in danger of extinction or deemed to be threatened or otherwise in need of special protection. Where possible, existing known populations of the priority taxa described in this program should be protected from further damage or destruction.

Importantly, this section provides guidelines for locating new populations, especially on Narrogin District conservation reserves, where certain species may have not yet been surveyed. The location of populations, if possible on these reserves, is critical for the long term survival and management of these species. The file "Prospect", (created during the development of this plan) which categorises Nature Reserves by area and geology unit, can be used as a predictive survey tool in conjunction with the written information provided in this section.

Field surveys by the authors for Priority One and Two taxa took place from October 1992 until October 1994 as part of a program by CALM to research and locate existing and new populations of these taxa. Priority Three taxa were not specifically included in the field surveys.

Descriptions of species were compiled by consulting references, from discussion with botanists and examining Herbarium specimens. The known species distribution is described along with habitat information. This information was gathered from Departmental Rare Flora files and the 1:250000 Geological Series plans. Emphasis was placed on the particular habitat characteristics of locations in the Narrogin District. The list of known populations refers to the Narrogin District populations only. Populations occurring outside the District are described in similar management programs. Populations with an asterisk (*) are populations known only from a Herbarium collection and have not yet been searched for or were unable to be relocated. Generally for each population the condition of the population is recorded. However, in some instances where no population details are known for a species the collector surname is listed. This is provided as a reference for additional information to be obtained from the collector.

In March 1996, there were 27 Priority One, 49 Priority Two and 44 Priority Three taxa recorded in the Narrogin District.

Priority Four taxa (rare but not threatened) are listed part D of this section. They have been adequately surveyed and are considered to require minimal management, apart from routine monitoring, to ensure their conservation in the wild. They are usually represented on conservation reserves. Their status may change if present circumstances alter (for example land clearing, the introduction of *Phytophthora* dieback disease or increased salination) and they may be recommended for addition to the Declared Rare Flora Schedule.

A. Priority One Taxa

Acacia brachypoda Maslin

MIMOSACEAE

A dense rounded slightly aromatic shrub 1.5-2 metres tall with smooth bark and glabrous, flat and yellow or green branchlets with broad nerves. The 2-5 cm long and 0.7-1.4 mm wide phyllodes are terete to flat and linear, green, glabrous, straight to slightly incurved, patent to erect, 1-nerved per face when flat. Flower heads simple, 2 per axil, are medium golden, 8- 9 flowered. The bark may be fissured at the base of the stems with age, the upper branches often brownish. The branchlet nerve not prominent to the unaided eye except on older parts when they are brown, shiny and distant. At the tips of the branches the flat nerves are green, shiny and close together. The legumes curved and/or undulate to coiled, 7-8 mm wide, thinly leathery, glabrous containing longitudinal oblong to oblong-ovate 4 mm long seeds with a thick aril. Distinguished from other members of the *A. wilhelmiana* group by its short peduncles and few-flowered heads.

Flowering period: May-June

Distribution and Habitat in the Narrogin District

Occurs in swampy areas on sandy loam or grey sandy clay soils on slight rises, from near the headwaters of the Darkin River eastwards to near Mount Kokeby Siding, south of Beverley. It grows in association with myrtaceous shrubland, open wandoo woodland, or open areas. Other species it may be associated with include *Allocasuarina* sp. *Callistemon phoeniceus*, *Hakea varia*, *Leptospermum* sp. and *Melaleuca* sp.

Conservation Status

Current: Priority 1[#]

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|------------------------|-------------|-------|-------------|---------------|-----------|
| 1* Mount Kokeby Siding | 11/06/89 | Bro | PP | 100's | Maslin |

Bro Shire of Brookton

* population known only as Herbarium record

Response to Disturbance

Unknown. However, rising salinity and waterlogging may seriously affect the long term the long term survival of population number 1.

Susceptibility to *Phytophthora* Dieback

Unknown.

Management Requirements

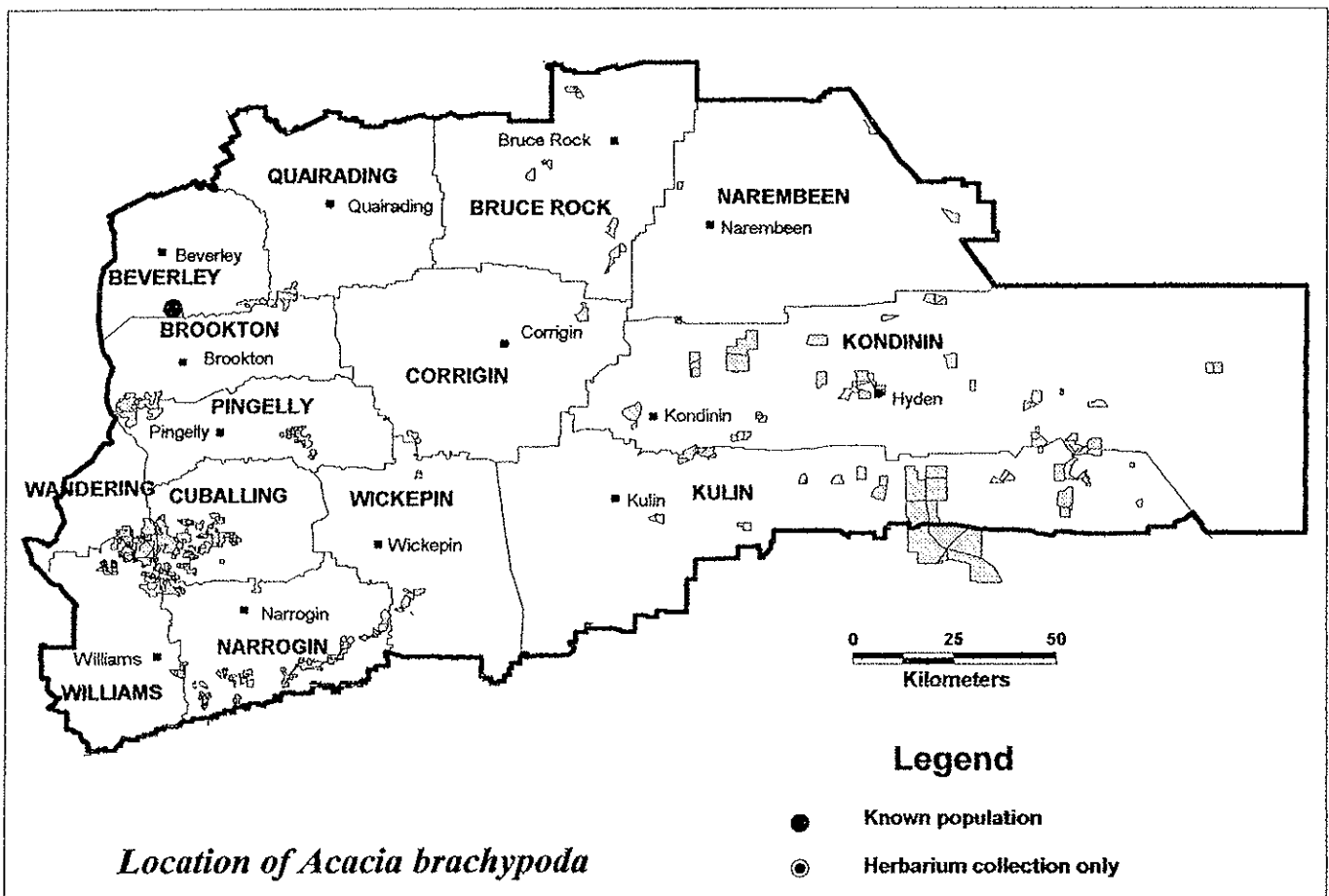
[#] now Declared Rare Flora (updated at December 1999)

- Nil until populations relocated.

Research Requirements

- Survey to relocate population 1. Determine numbers, habitat and long term threats.
- Survey for new populations on adjacent conservation reserves with similar habitat.

References Maslin (1990).



Acacia caesariata Cowan & Maslin

MIMOSACEAE

A. caesariata is a dense, rounded-triangular or flat-crowned shrub spreading to 2-3 metres in diameter with grey bark, rough at stem bases, and smooth on the branches. The slightly ribbed branchlets may be cylindrical, and are covered with dense woolly hair. The new growth is white. The phyllodes are brown, hard, straight or slightly curved, 20-45 mm long and 3-10 mm wide, narrowly oblong to inversely lance shaped with a short spiny tip. The phyllode has 1-3 nerves on each face. The 4 mm diameter flower heads are round with 18-20 dark lemon-yellow flowers per head. The seed pods are oblong, 12-25 mm long and 2.5-3 mm wide.

The species is derived from the Latin word *caesariatus*: covered with hair or long-haired, refers to the general hairiness of the plant.

Flowering period: August - September. Seeds in January.

Distribution and Habitat in the Narrogin District

It is thought to occur in the area south of Kumminin, although no Herbarium specimen exists. It has not recently been relocated. In the Merredin District it occurs on hard gritty loam or clay in mallee scrub of *Eucalyptus oleosa*, *E. loxophleba* and *E. gracilis* woodland. The geologic relationship is not clear, the association may be colluvium from weathered granitic rocks.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|----------------|-------------|-------|-------------|---------------|-----------|
| 5 Sth Kumminin | 31/08/94 | Nar | RWR | Nil | Unknown. |

Nar Shire of Narembeen
* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

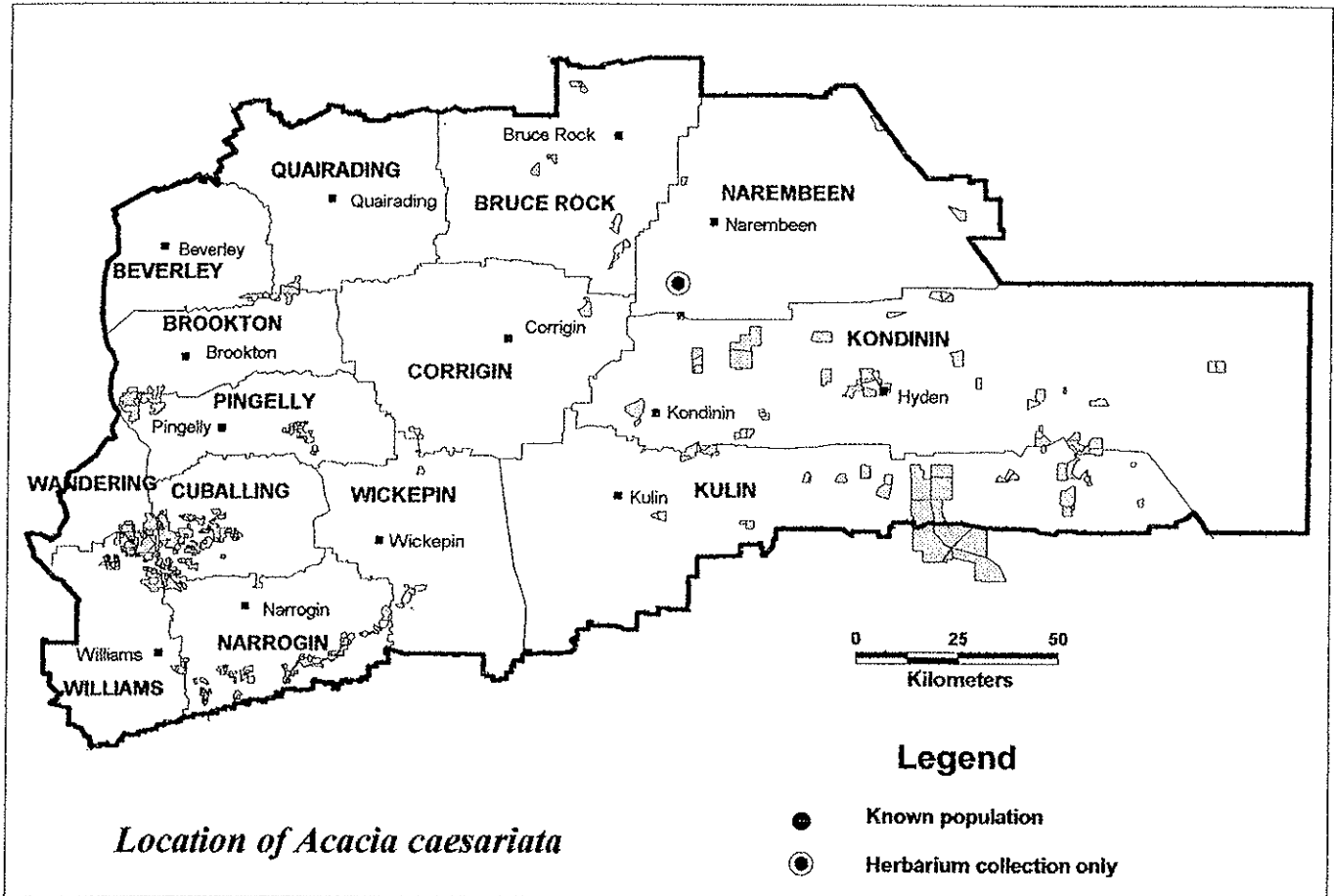
Management Requirements

— Nil

Research Requirements

- Survey for new populations in similar habitat.

References Maslin (1979).



A spreading, multi-stemmed cylindrical branched resinous shrub to 2 metres tall. The triangular stipules are about 1 mm long, hairy, falling off early or obscured by white dry resin. The blunt phyllodes are 43-60 mm long and 3-5 mm wide and are strap shaped ending in a sharp point with a swollen leaf base 1-1.5 mm long. The phyllodes are straight or weakly curved, mostly hairless with 2 or 3 widely spaced main nerves on each face. Secondary nerves are numerous. Peduncles are 3-5 mm with many red micro-hairs. The 34-38 flowered globe shaped flower-heads are 4-6 mm in diameter. The flowers consist of 5-parts. The sepals are half as long as petals. The hairless petals are free. The hairless, sticky, 8.5-12 cm long and 2-3 mm wide legumes are bowed with narrow parallel edges.

Flowering period: July - September

Distribution and Habitat in the Narrogin District

A. lanei is only known in the Hyden - Karlgarin area. It grows along creek and drainage lines on brown sandy loams and also red clay with other *Acacia*'s, *Eucalyptus loxophleba* subsp. *lissophloia*, *E. salmonophloia* and *Melaleuca* sp.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|----------------|-------------|-------|-------------|---------------|---------------|
| 1 E of Hyden | 14/09/93 | Kon | RVS | 1 | Healthy |
| 2 S of Hyden | 06/10/94 | Kon | RVS | Nil | Not relocated |
| 3* S of Hyden | 21/08/85 | Kon | | ? | Unknown. |
| 4 SSE of Hyden | 06/10/94 | Kon | RVS | Common | Healthy |

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

Reported that stock will not graze the mature bushes. Other disturbance responses unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

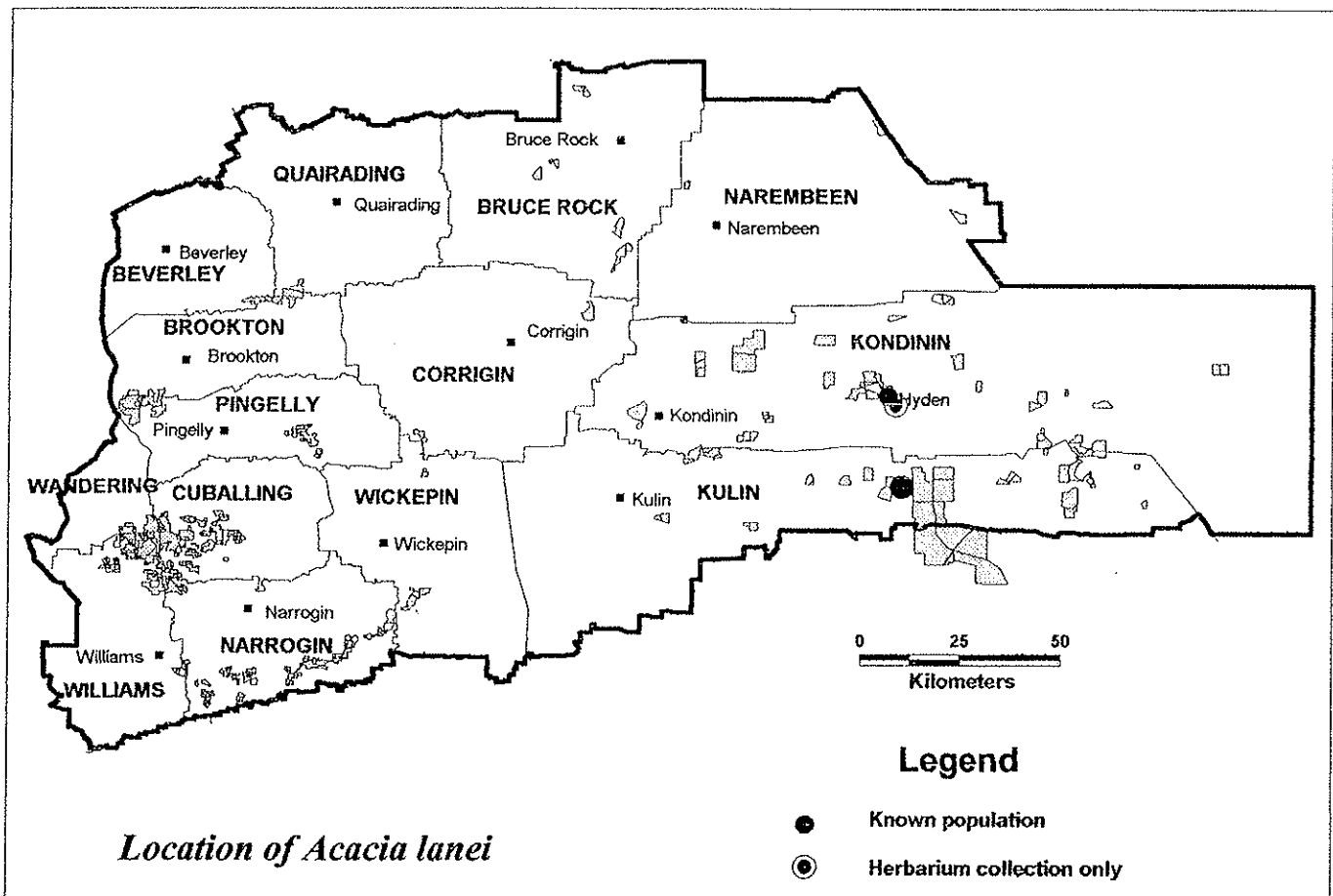
Management Requirements

— Monitor known populations every two years.

Research Requirements

- Survey for additional populations especially on conservation reserves. It appears to be restricted to depressions and drainage lines.
- Relocate population reported on Mr D. Lane's property near Dragon Rocks Nature Reserve.
- Study the benefits of this plant for revegetation. It is reported to be an excellent windbreak species and not grazed by livestock.

References Cowan & Maslin (1990).



Acacia sclerophylla var. *teretiuscula* Maslin & Blakely

MIMOSACEAE

A dense 0.2-3 metre tall rounded or flat-topped shrub with slightly angular branchlets, that are more or less scaly with stiff hairs. The reddish branches are cylindrical. The dark brown or black stipules are minute, The 2-3 cm long and 1.5 mm wide straight or curved thick, stiff, semi-cylindrical phyllodes are resinous. They may be slightly longitudinally grooved, or with three faintly depressed longitudinal nerves. The phyllode has a short pointed end. The hairless peduncles are usually in pairs. The 7-10 spherical flower heads are in 5 parts with 12-20 free flowers. The sides of the sepals are parallel except at base and tip and hairless. The petals are smooth, rather broad, more than 2 times the length of sepals. The ovary is slightly covered with very short, stiff hairs. The 6 cm long and 2-3 mm wide legume are linear and curved to coiled. The species and variety name refer to the hard, somewhat rounded stiff phyllode.

Flowering period: August - September

Distribution and Habitat in the Narrogin District

Known from east of Merredin to near Lake Grace and Newdegate. One outlying population has been collected further west, south of Beverley, at Kokeby siding. The plant appears to prefer habitat consisting of clay-loam soils, alluvium, in depressions on seasonally wet areas. These may be sometimes near salt lakes in open *Eucalyptus* woodland with *Melaleuca uncinata* and samphire species. However, near Newdegate it occurs on laterite.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|------------------|-------------|-------|-------------|---------------|-------------------------|
| 3 * Bruce Rock | 9/1917 | Bru | ? | ? | Unknown. |
| 4* Bending | 15/11/72 | Kon | NR | ? | Unknown. |
| 6* Kokeby Siding | 30/08/94 | Bev | RVS | Nil | Unknown.-Not relocated |
| 7* Kondinin | 19/12/89 | Cor | ? | ? | Unknown.- Not relocated |
| 8 Kondinin | 31/08/94 | Kon | RVM | 1 | Healthy |
| 9* E Kondinin | 09/09/88 | Kon | ? | ? | Unknown. |

Bru Shire of Bruce Rock

Kon Shire of Kondinin

Bev Shire of Beverley

Cor Shire of Corrigin

* population known only as Herbarium record

Response to Disturbance

Unknown. However, may be salt sensitive.

Susceptibility to *Phytophthora* Dieback

Unknown.

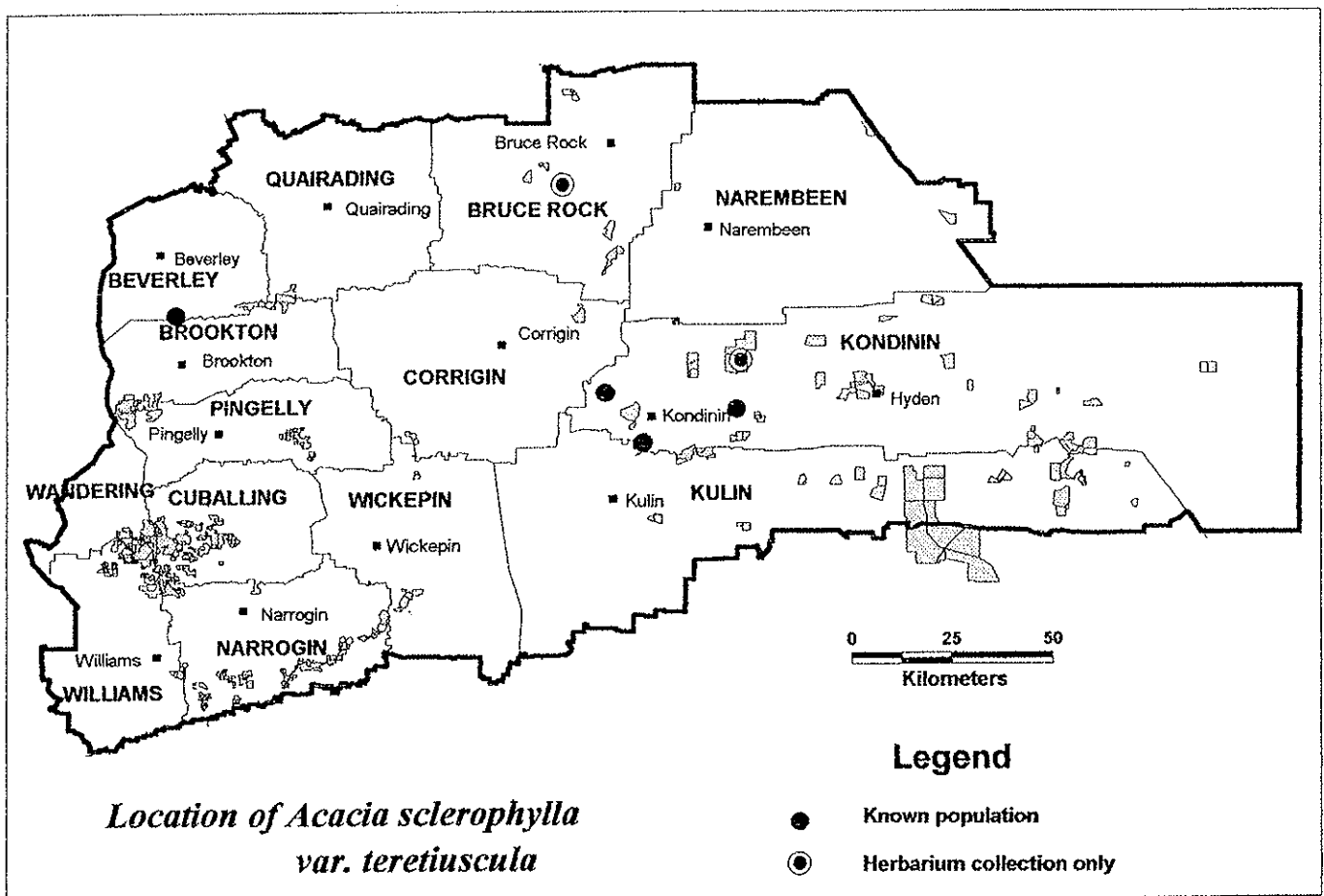
Management Requirements

- Protect population number 8 from disturbance and notify Main Roads W.A.

Research Requirements

- Survey for additional populations.
- Confirm whether this species is at risk from rising saline ground water.

References Maiden & Blakely (1928), Maslin (personal communication).



Acacia tetraneura Chapman & Maslin ms.

MIMOSACEAE

A spreading sometimes flat-topped 0.3-0.4 metre tall shrub with sparse flattened down hairs on extremities of the branchlets. The 2-7 cm long and 1.5-3 mm wide phyllodes are cylindrical or flat and linear shaped with a spiny tip. They are rigid, erect, mostly shallowly incurved, hairless except on the swollen leaf base with 4 conspicuously raised, widely spaced nerves that are flat-topped and 0.5-1 mm wide. The spherical, light-golden, 5 mm diameter flower heads are more or less without a stalk and there are 2 per axil and 13-20 flowers per head. The bracteoles are dark brown. Flowers consist of 4 parts. The calyx segments are more or less united. When opened the 5 cm long and 3 mm wide legumes are linear shaped with a shallow constriction between the seeds. They are curved and slightly twisted, hairless with broad margins. The species name refers to the 4 conspicuously raised nerves on the phyllodes.

Flowering period: June - August.

Distribution and Habitat in the Narrogin District

A. tetraneura is known from south west of Bruce Rock, east of Dragon Rocks, near South Ironcap and Mount Vernon. It may be found growing on low hills in shallow loam over laterite and in rocky (granitic) clay in low heath. It may favour colluvium and alluvial soils.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|---------------|-------------|-------|-------------|---------------|---------------|
| 1 Mt Vernon | 04/11/93 | Kul | RVS | 20+ | Healthy |
| 2* Bruce Rock | 04/08/71 | Bru | ? | ? | Not relocated |
| 3 Mt Vernon | 04/11/93 | Kul | RVS | Common | Healthy |
| 4 Sth Ironcap | 04/11/93 | Kon | RVS | Common | Healthy |

Kul Shire of Kulin

Bru Shire of Bruce Rock

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

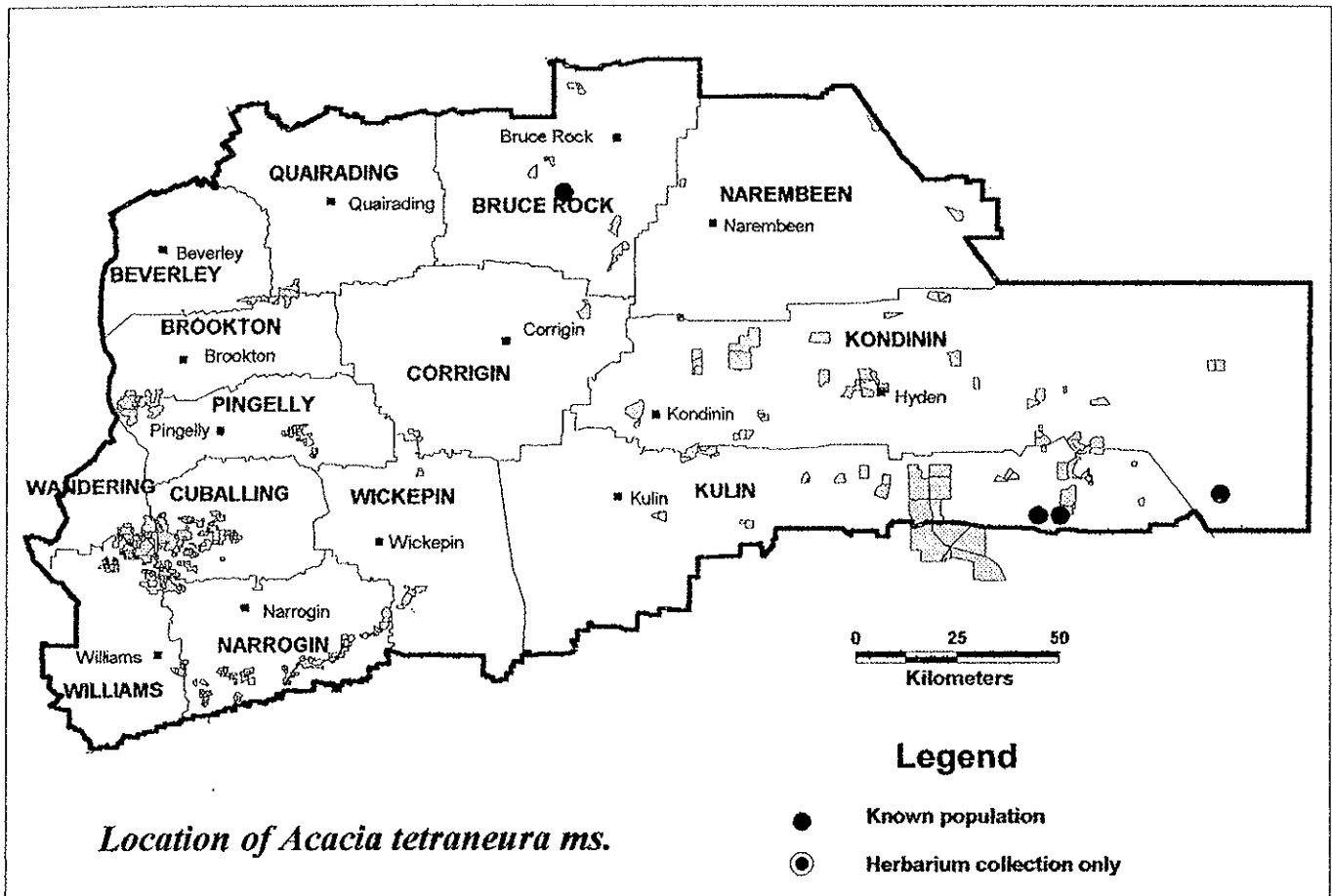
Management Requirements

– Monitor populations occasionally.

Research Requirements

- Survey for new populations. Because of its widespread Narrogin District distribution, this plant also may occur in the Katanning and Merredin CALM District's.

References Chapman &. Maslin (personal communication).



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

ORCHIDACEAE

A Dwarf Mustard Spider Orchid about 20-30 cm tall. The leaf is 10-15 cm long and about 3 mm wide. The 1-2 flowers per plant have a prominently curled lip, are pale yellow in colour, with a length of 8-10 cm and the width is 5-6 cm.

Flowering period: September - October.

Distribution and Habitat in the Narrogin District

Collected from only two locations, one south of Williams which was burnt in 1986 and has not been relocated and the other south of Newdegate. It was recorded growing as scattered individuals under dense sheoak thickets (presumably *Allocasuarina huegeliana*) near granite outcrops. It is sometimes associated with *Eucalyptus loxophleba* or *E. wandoo*, and also *Borya constricta* herbfields.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|----------------------|-------------|-------|-------------|---------------|--------------------------------------|
| 1* South of Williams | 17/09/85 | Wil | TWS | ? | Unknown. Presumed destroyed by fire. |

Wil Shire of Williams

* population known only as Herbarium record

Response to Disturbance

Appears to respond poorly to fire, especially if followed by weed invasion.

Susceptibility to *Phytophthora* Dieback

Unknown.

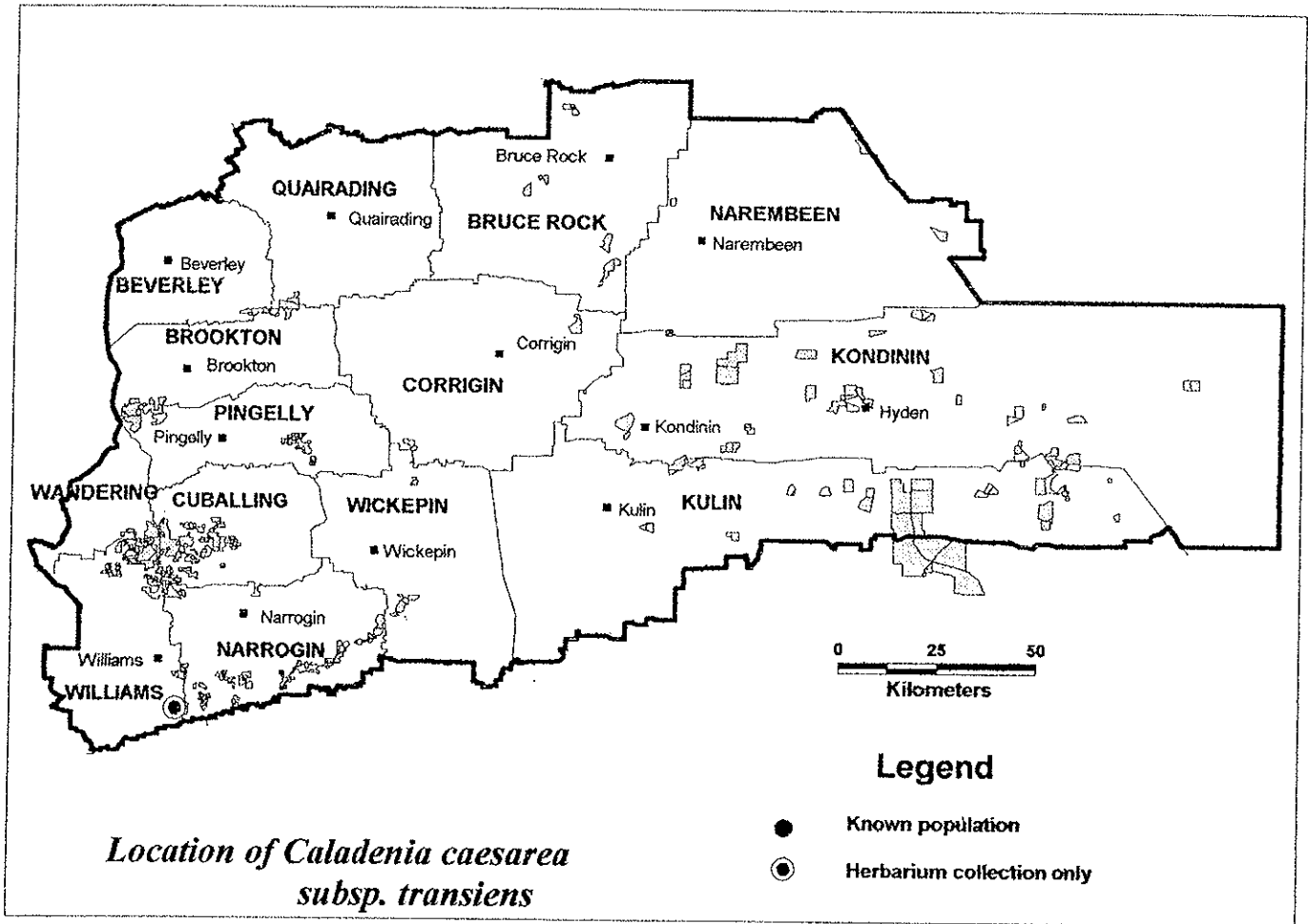
Management Requirements

– Nil until populations located.

Research Requirements

- Attempt to relocate population number 2.
- Survey for new populations in similar vegetation types in similar habitats.

References Hoffman & Brown (1992). Clements (1989).



Conospermum scaposum Bentham

PROTEACEAE

C. scaposum is a perennial 'broom-like' shrub or undershrub about 40 cm tall, the leaf-stalks and lower parts of the stem are covered with fine spreading hairs. The lance-shaped leaves arise from the base of the plant, with a hardened, thickened point and thickened margins. The leaf blade is 1.2-4 cm long and narrows into a stalk about the same length. The globe-shaped single flowers are pale-blue, about 5 mm long grouped in a dense, terminal hairy spike at the end of unbranched or slightly branched flower-stalks. The flower-stalk is 12-40 cm high and arises from the base of the shrub. The fruit is small, cone-shaped with 1-seed per fruit. The species name refers to the flower-stalks arising from the plant's base.

Flowering period: November - February.

Distribution and Habitat in the Narrogin District

It is believed to occur in the Tincurrin - Toolibin area, although no Herbarium record exists. Elsewhere it occurs south of Badgingarra and from Mogumber where it inhabits sandy coastal heath in wet and depressed sandy-clay soils. It grows with *Banksia* sp., *Verticordia* sp., *Hakea* sp., *Stirlingia* sp. and *Lechenaultia floribunda*. In the Narrogin District it may occur in alluvial and colluvium geological types.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|--------------|-------------|-------|-------------|---------------|---------------|
| 4* Tincurrin | ? | Wic | RVS | Common | Unknown. |
| 4 Tincurrin | 03/11/93 | Wic | RVS | Nil | Not relocated |

Wic Shire of Wickepin

* population known only as Herbarium record

Response to Disturbance

Unknown, although it may respond favourably to mechanical or fire disturbance.

Susceptibility to *Phytophthora* Dieback

Presumed susceptible.

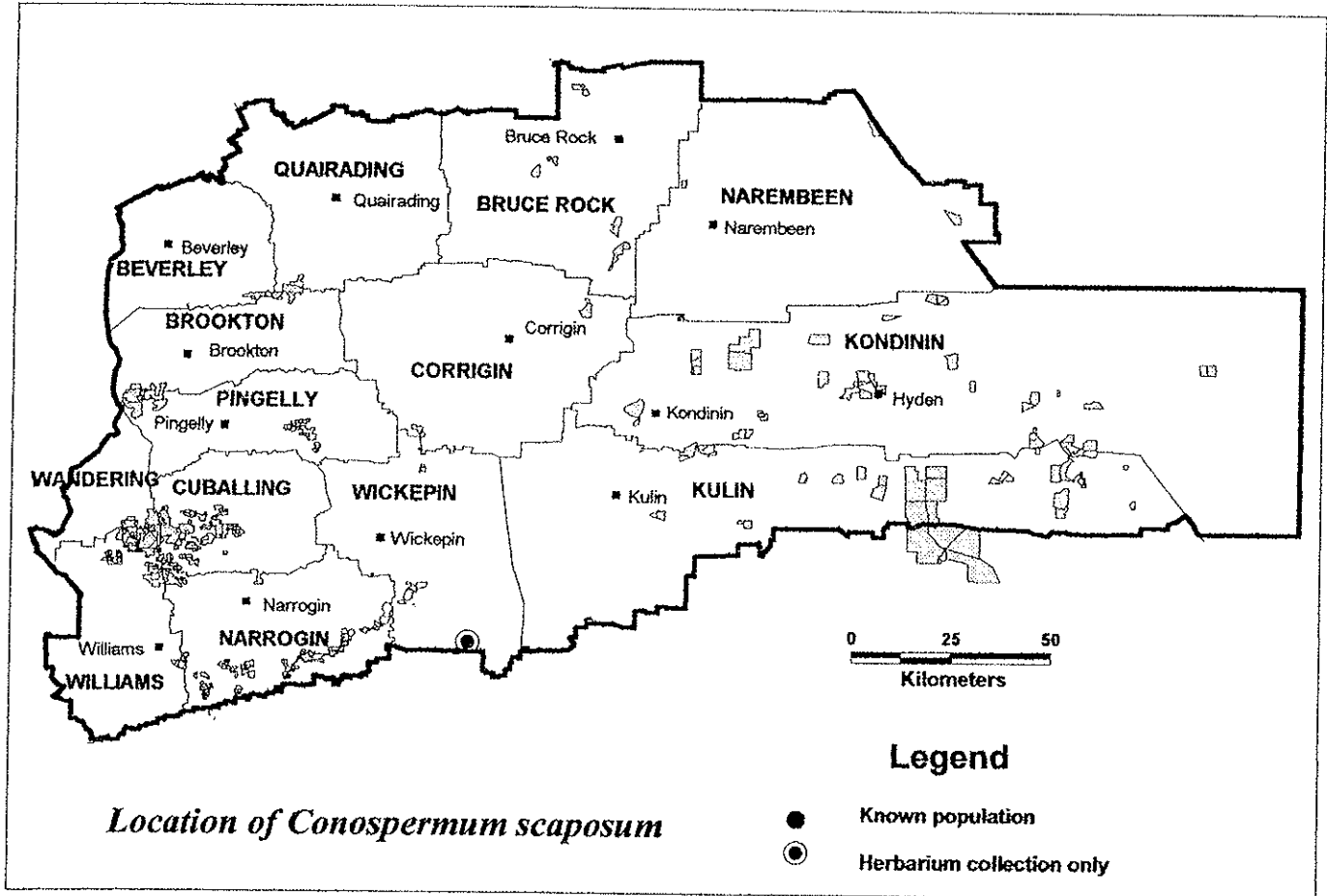
Management Requirements

Nil

Research Requirements

- Attempt to relocate population number 4 and survey for new populations.

References Bentham (1870), Blackall & Grieve (1974) Leigh, Boden & Briggs (1984).



Cryptandra intonsa Rye

RHAMNACEAE

A distinctive species with no close relatives, growing as an erect or spreading shrub, 0.3 - 0.6 metres tall with non spiny branchlets. The young stems are densely hairy. 4-6.5 mm stipules are prominent that are long and gradually tapering to a sharp point, usually appearing glabrous but are often sparsely and minutely hairy. The undersurface of the 0.5 - 0.8 mm petioles are hairy. Linear or narrowly oblong leaf blades are 5 - 7 mm long by 0.6 - 1 mm wide, with a prominent curved point that is 0.2 - 0.5 mm long, and located at the leaf tip. The lower leaf surface is densely hairy but usually concealed the upper surface being minutely bumpy. There are 6 - 9 floral bracts per flower that are oval shaped, 2.5 - 3.5 mm long. Pedicels are about 0.4 mm long and densely hairy. Flowers occur in a 9 - 14 mm wide, cream to white, head like cluster consisting of 7 - 15 flowers per branchlet. The floral tube is 3 - 3.5 mm long and minutely hairy. The densely hairy sepals are 1.8 - 2.3 mm long. It may be distinguished easily by the large conspicuous stipules, prominently pointed leaves and densely clustered flowers. The species name refers to the long stipules which persist after the leaves have been shed giving the young stems a bristly appearance.

Flowering period: September - December.

Distribution and Habitat in the Narrogin District

Known only from an area near Middle Ironcap south east to near Hatters Hill. It may be found occurring in clay soils associated with ironstone gravel in association with scattered mallee vegetation.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-----------------------|-------------|-------|-------------|---------------|-----------|
| 1* South of Rons Road | 29/11/93 | Kon | VCL | ? | Unknown. |

Kon Shire of Kondinin
* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

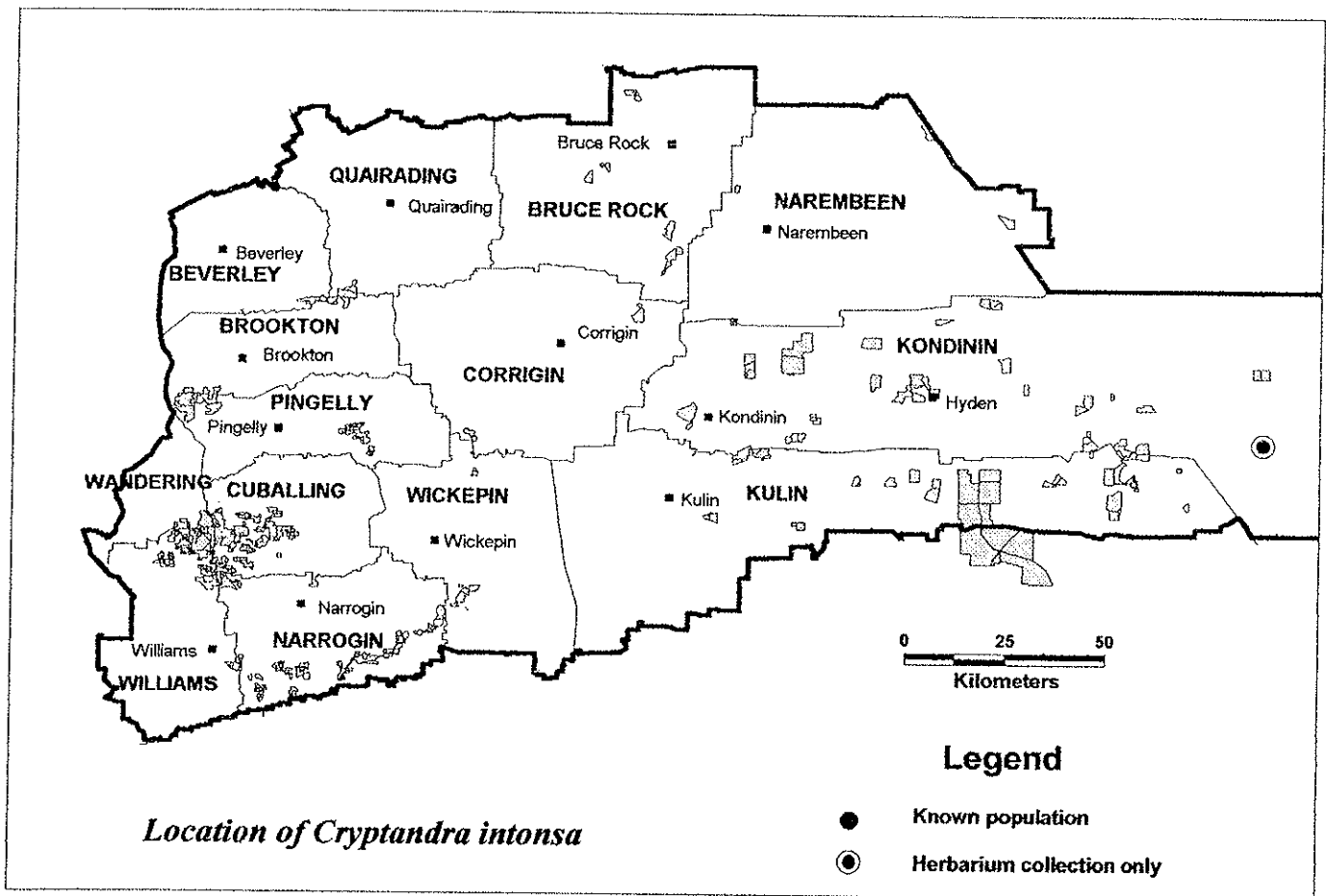
Management Requirements

– Nil until populations relocated.

Research Requirements

- Survey to relocate population number 1, record population number, associated species and condition.
- Survey for new populations on similar vegetation and geological types within the adjacent Vacant Crown Land and Lake Cronin Nature Reserve.

References Rye (1995).



Dampiera scaevoliana Gardner ex. Rajput & Carolin

GOODENIACEAE

D. scaevoliana is a multi-stemmed perennial shrub to 70 cm tall. The stems are cylindrical, ribbed, and hairless except for densely hairy grooves. The oblong or concave leaves are bundled, 5-10 mm long and 1-1.5 mm wide, without teeth, lobes or stalks. Peduncles have silvery hairs and are grouped 2-3 together, each 2-4 mm long and bearing a single flower. Bracteoles are leaf-like, hairless, 4-6 mm long and about 1 mm wide. The sepals are 0.2-0.5 mm long and covered with silvery hairs. The corolla lobes are blue or white in colour.

The species name refers to the similarity of the flowers to those of the genus *Scaevola*.

Flowering period: October - November

Distribution and Habitat in the Narrogin District

In the Narrogin District, *D. scaevoliana* was collected at the foot of Holt Rock and also 4.8 kilometres south of South Kumminin. It is not clear what habitat this plant prefers however, it is presumed to occur in loam and on sandy and gravelly soils.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|--------------|-------------|-------|-------------|---------------|-----------|
| 2* Holt Rock | 19/11/31 | Kul | ? | ? | Blackall |
| 7* Kumminin | 21/10/64 | Nar | ? | ? | Newbey |

Kul Shire of Kulin

Nar Shire of Narembeen

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

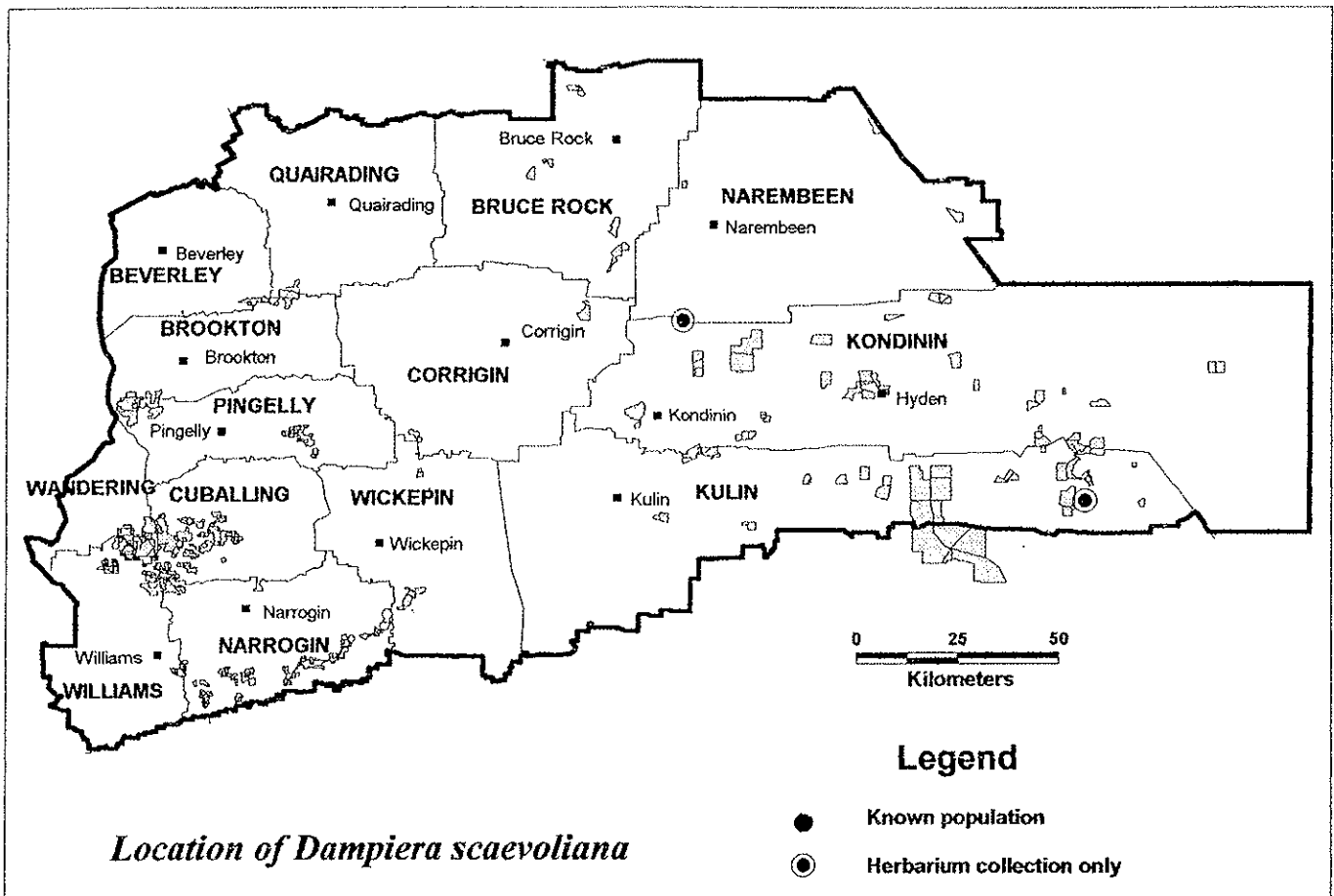
Management Requirements

- Nil

Research Requirements

- *D. scaevoliana* has not been collected since 1964. Urgent survey for this species is required especially on conservation reserves.

References Rajput & Carolin (1988).



***Eremophila adenotricha* (F.Muell. ex Benth.) F.Muell.**

MYOPORACEAE

A shrub with a weedy appearance growing to 1.3 m tall, densely clothed with glandular, rust coloured or sticky short hairs. The leaves are about 2.5 cm long and 2 mm wide, crowded together, flattened, with long and narrow to blunt, rather thick, soft, sticky with hairs on both sides. The flowers are solitary, large with purple petals and without stalks. It flowers progressively, from older to younger parts, therefore the plant bears mature fruit through to new buds simultaneously.

The name is derived from the Latin word *adenotrichus*, having glandular hairs.

Flowering period: September - December.

Distribution and Habitat in the Narrogin District

E. adenotricha is recorded growing in the Holleton and Glenelg Hills area east of Narembeen, with an unrecorded collection from near Wubin. There are no habitat details for the population recorded in the Narrogin District. However, the recently discovered population from near Holleton in the Merredin District records it growing on stony red soils. Amphibolite and Migmatite may be the associated geological type where further populations may be located. It is found growing in association with low woodland and scrub vegetation.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|------------------|-------------|-------|-------------|---------------|----------------|
| 1* Glenelg Hills | 09/1929 | Nar | ?NR | ? | Not re-located |

Nar Shire of Narembeen

* population known only as Herbarium record

Response to Disturbance

It is thought to regenerate after fire or mechanical disturbance events.

Susceptibility to *Phytophthora* Dieback

Unknown.

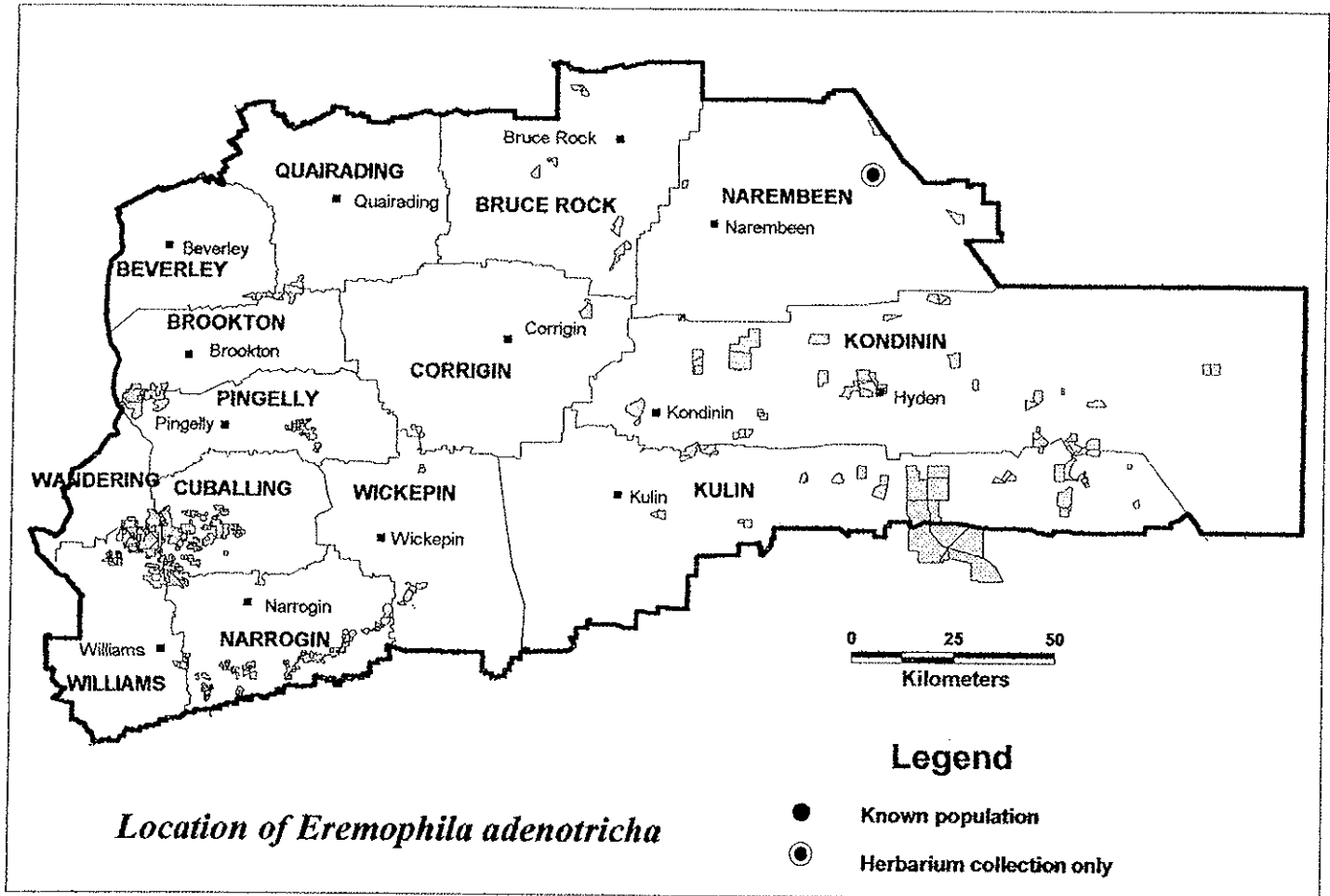
Management Requirements

– Nil.

Research Requirements

- Survey for populations on Amphibolite and Migmatite geological associations in the eastern portion of Narrogin District.

References Blackall & Grieve (1982), Marchant & Keighery (1979), Leigh & Briggs (1988), Bentham (1863-1878).



Eucalyptus loxophleba x wandoo

MYRTACEAE

E. loxophleba x wandoo is a hybrid between York Gum and Wandoo. It is a mallee with a thick trunk, or tree to 15 metres tall. Its bark can be loose, rough, brown-black in colour over most of stem and may be smooth white above. The leaves are dull bluish-green, with veins more conspicuous than those of Wandoo and less than those of York Gum.

Flowering period: Uncertain, Presumed September.

Distribution and Habitat in the Narrogin District

Known from south of Eneabba, near Northam, Quairading, Wickepin, Birdwhistle Rock and Wagin. At Quairading and Wagin it grows in alluvial valley soils, in grey sandy clay and grey-brown sandy loam. West of Quairading the habitat is low forest with *Acacia acuminata* and at Wickepin it is woodland on the edge of alluvial soils. Always found in the presence of Wandoo and York Gum.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|---------------|-------------|-------|-------------|---------------|-----------|
| 3 Wickepin | 30/08/94 | Wic | NR | 1 | Healthy |
| 7 Quairading | 27/04/94 | Qua | RVM | 1 | Fair |
| 8 Birdwhistle | 18/09/94 | Nar | SR | 1 | Healthy |

Wic Shire of Wickepin
Qua Shire of Quairading
Nar Shire of Narrogin
* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

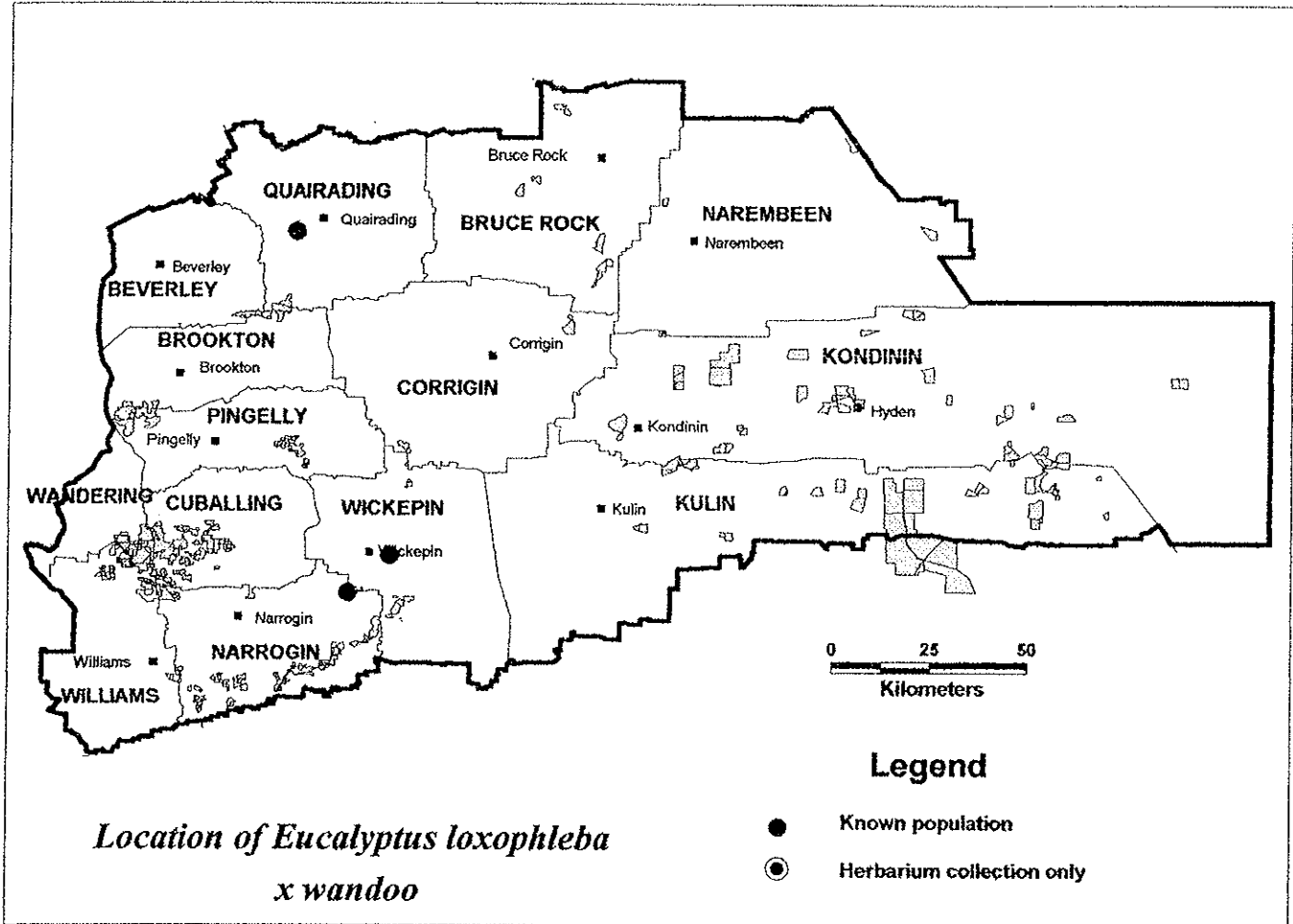
Management Requirements

– Monitor populations occasionally.

Research Requirements

– Survey opportunistically and record location of new populations.

References Brooker (1990).



Eucalyptus myriadena subsp. *parviflora* Brooker & Hopper

MYRTACEAE

A small tree or mallee with dark grey to grey-black rough and flaky bark on the lower half of trunk or stems, that can be in strips. The bark smooth and greenish-grey above. The crown is dense. The juvenile leaves are lance-shaped to egg-shaped. The adult leaves are narrow to lance-shaped, very glossy, green to dark green with very fine side veins. The unbranched flower cluster occurs in the leaf axil with more than 7 flowers. The 0.5-1.8 cm long flower stalk is cylindrical or angular. It differs from *E. myriadena* subsp. *myriadena* by its smaller flower buds being 3mm x 1.5 mm and the fruit 2 mm x 2 mm. *E. myriadena* subsp. *parviflora* has the smallest buds and fruit of all Eucalypts in the southern half of Western Australia to which the subspecies name refers.

Flowering period: Not known however, may be November - April.

Distribution and Habitat in the Narrogin District

Known from 6 locations from near Southern Cross southwards to Bruce Rock and east of Hyden, occurring in scrub mallee woodland and has been reported growing on red loam, at the edge of swamps, and on heavy red soil in hollows.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|-------------------|-------------|-------|-------------|---------------|-----------|
| 3* Bruce Rock | 14/04/53 | Bru | ? | ? | Royce |
| 4* Bruce Rock | 14/04/53 | Bru | ? | ? | Royce |
| 5* North of Hyden | 24/08/88 | Kon | ? | ? | Brooker |
| 6* South of Hyden | 22/07/88 | Kon | ? | ? | Brooker |

Bru Shire of Bruce Rock

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

Unknown. However being a mallee, it is presumed it will re-sprout from a rootstock after fire.

Susceptibility to *Phytophthora* Dieback

Unknown.

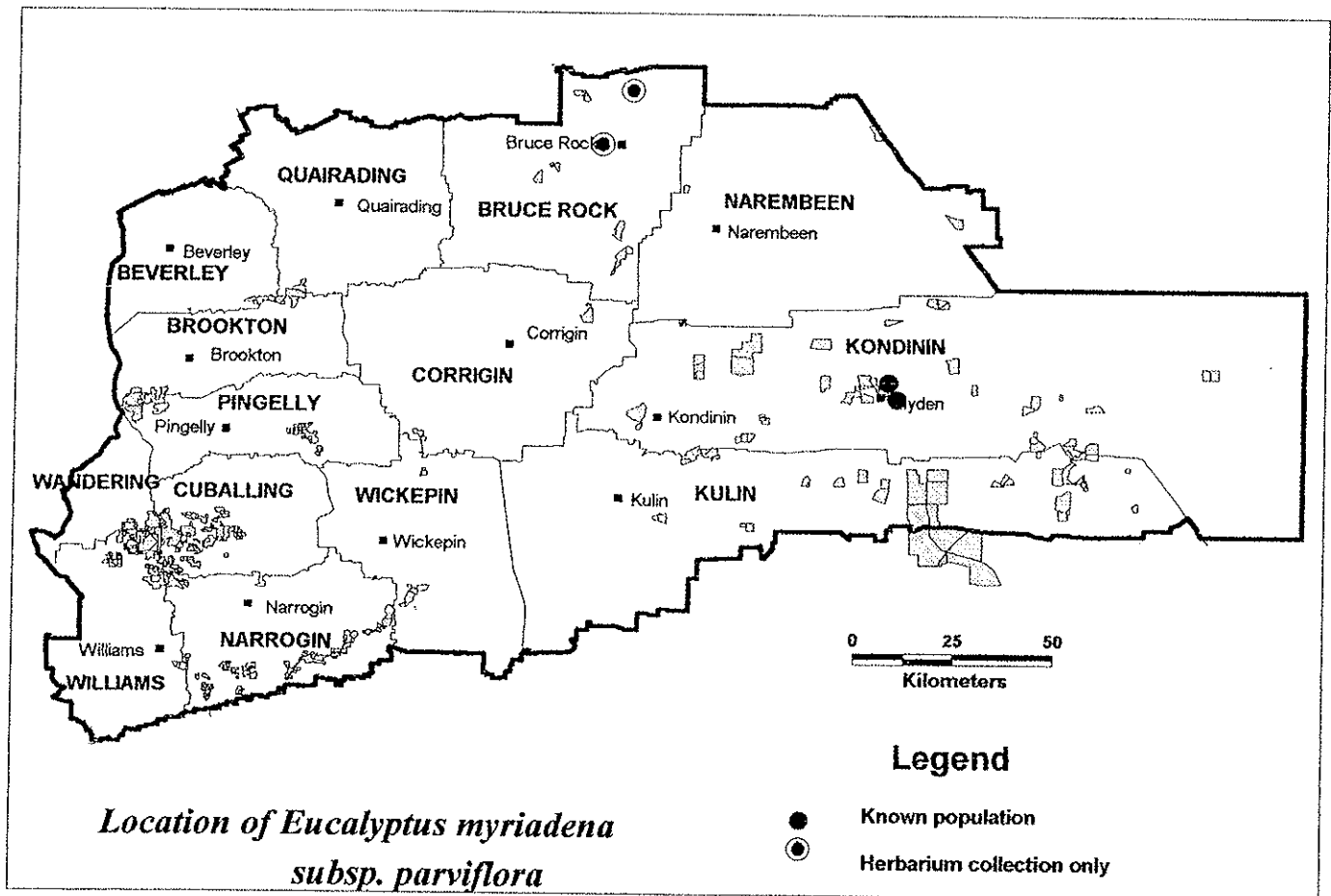
Management Requirements

- Nil until populations are located

Research Requirements

- Survey to relocate the populations recorded near Bruce Rock and Hyden, record numbers and document the habitat and location.

References Brooker & Kleinig (1990).



Eucalyptus subangusta subsp. *virescens* (Blakely)

Brooker & Hopper

MYRTACEAE

A smooth, grey or pale coppery barked mallee up to 5 metres tall with brownish-red branchlets, that are slightly glossy and ribbed. The leaves are light green, dull maturing slightly glossy, to which the subspecies name refers, with dark green spots, a yellowish central nerve and margin. The flower cluster consists of up to 17- white flowers. The peduncles to 1 cm long. The fruit is cup shaped, with a smooth join at the operculum. Seed light grey-brown, sub-spherical to cubed.

Flowering period: April, October

Distribution and Habitat in the Narrogin District

The main distribution of the subspecies is from Watheroo to the Wongan Hills. In the Narrogin District there is one known population from near Narembeen. *E. s.* subsp. *virescens* occurs in a variety of habitats including, yellow sand with *E. flocktoniae* and *E. sheathiana*; in white clay with *E. yilgarnensis* and *E. erythronema*; in clay loam with *E. salmonophloia* and *E. salubris*; on salty flats with *E. redunca* var. *melanophloia*, *E. wandoo* and *E. spathulata*.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-------------|-------------|-------|-------------|---------------|---------------|
| 1* Roach NR | 08/12/93 | Nar | NR | Nil | Not relocated |

Nar Shire of Narembeen

* population known only as Herbarium record

Response to Disturbance

Unknown. However, it is likely to re-sprout from root stock and regenerate by seed following a fire.

Susceptibility to *Phytophthora* Dieback

Unknown.

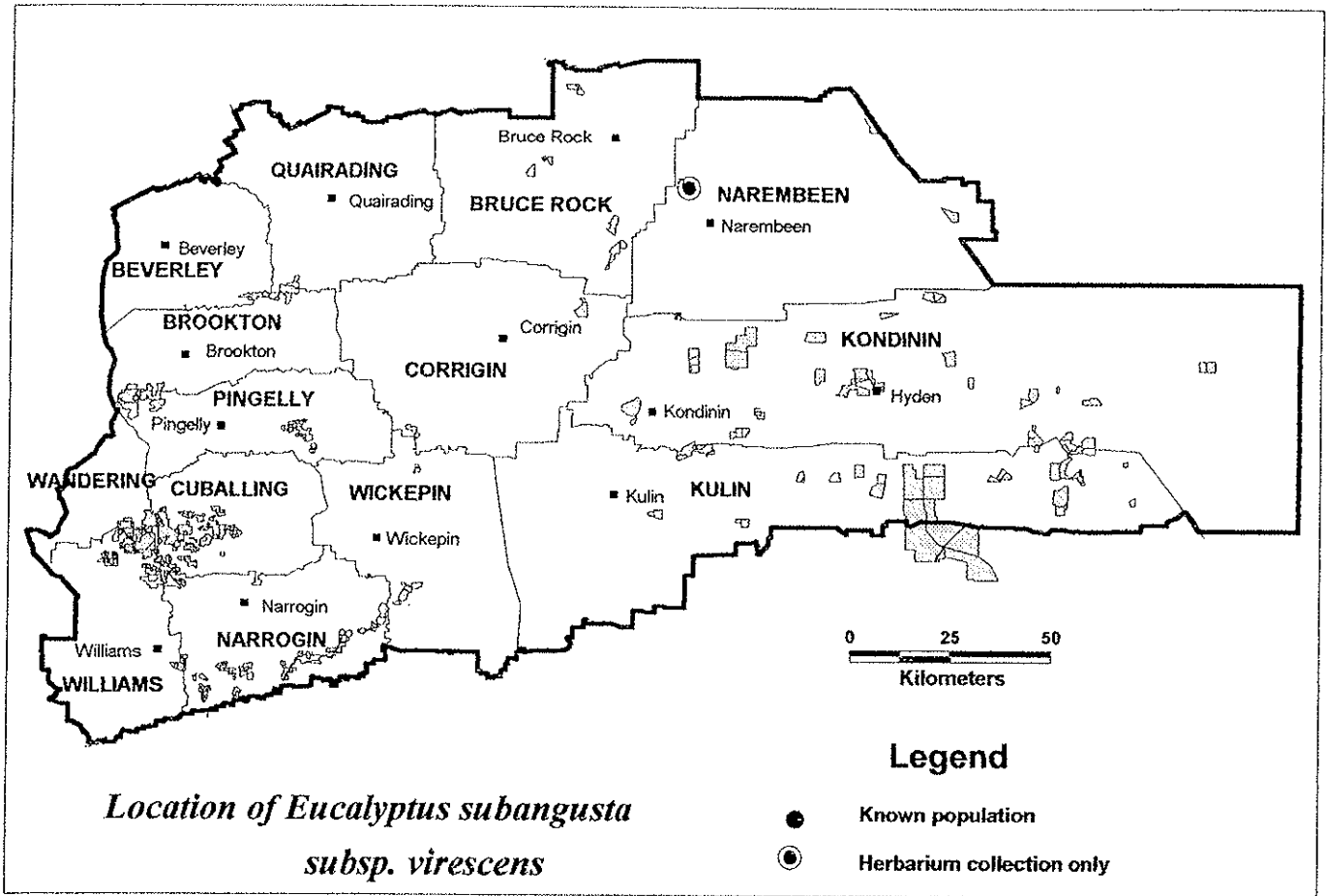
Management Requirements

- Nil until population number one relocated.

Research Requirements

- Survey to relocate population number one on Roach Nature Reserve.

References Brooker & Hopper (1991).



Grevillea lullfitzii McGillivray

PROTEACEAE

G. lullfitzii is an open spreading shrub to about 1.5 metres high. The branchlets are angular covered with loose closely pressed hairs. The leaves are 3-5 cm long curved upward with little or no stalk and divided two or three times. The leaf margins are rolled backwards towards the midrib, enclosing the lower surface except for mid-vein. The upper leaf surface is mostly hairless with a conspicuous mid vein on the lower surface. The leaf texture is leathery. The inflorescences are terminal, erect, about 10.5-20.5mm long. The flowers are off-white in colour. The fruit is 16-17 mm long and 6 mm wide, erect on erect stalks.

This species was named after Fred Lullfitz, a botanical collector for Kings Park, who collected it on a hill at Digger Rocks in 1964.

Flowering period: October - December.

Distribution and Habitat in the Narrogin District

G. lullfitzii occurs near Lake Cronin, South Ironcap and Digger Rock, approximately 100 kilometres east of Hyden.

It occurs on sand over laterite soils in association with scrub and heath vegetation.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-------------------|-------------|-------|-------------|----------------------|-----------|
| 1 Digger Rock | 10/12/93 | Kon | VCL | Common | Healthy |
| 2 Lake Cronin | 15/09/93 | Kon | NR | c. 50 | Healthy |
| 3 Cairstairs Road | 04/11/93 | Kon | VCL | Common- Scattered | Healthy |
| 4 South Ironcap | 10/12/93 | Kon | RVS | 14+ | Healthy |

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

The response to disturbance is unknown however, it is presumed to regenerate after fire.

Susceptibility to *Phytophthora* Dieback

Unknown.

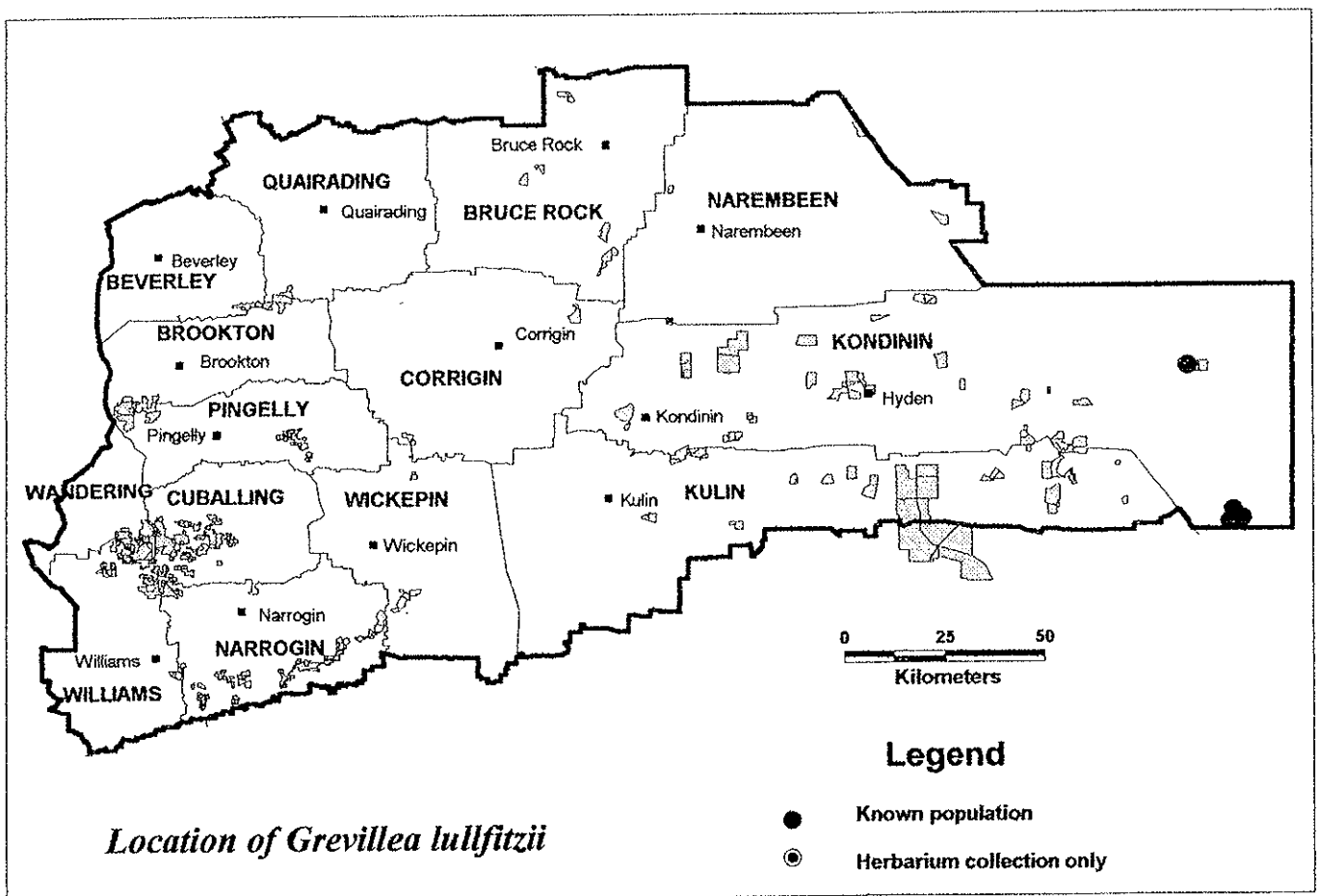
Management Requirements

- Maintain roadside markers at population number 2.
- Monitor populations occasionally.

Research Requirements

- Survey for additional populations within the Forrestania area on sand over laterite soils.
- Study the response to fire of the recently burnt population number 2.
- Confirm correct identification of population number 2.

References McGillivray (1993).



Grevillea marriottii P. Olde.

PROTEACEAE

G. marriottii is a many branched lignotuberous shrub, sometimes open, 0.8-1.2 metres high and 0.5-1.0 metre wide, with erect stems and angular, rigid and hairy branchlets. Most of the hairs on the branchlets fall off but are persistent in the leaf axils. The 0.5-5.2 cm long and 1.5-3.5 mm wide leaves are erect to spreading, sessile, simple, sometimes linear, or bifid or trifid, with a acute callous point. The midvein has an impressed groove, with the leaf margins smoothly revolute, usually obscuring the undersurface which is hairy. The 1.5cm long and 1cm wide umbel shaped flower pairs are terminal and erect, unbranched, sessile or on very short peduncles. The 2-3mm long and 0.7mm wide, oblong shaped perianth is greenish in colour becoming white. The style is white with occasional pink tones. The flowers are appressed and hairy with 2-3.5mm long pedicels, the flower receptacle is 0.7-0.8mm across. The oblique shaped fruits are 10-14 mm long and 4-5mm wide on a strongly incurved stalk. The major distinguishing features are the simple or bifid-trifid sessile leaves, the terminal umbel like flower pairs and the 3-ribbed fruit on a markedly incurved stalk. The juvenile plants have broader, thinner leaves with conspicuous lateral veins.

Flowering period: Winter - Spring.

Distribution and Habitat in the Narrogin District

Confined to an area a few kilometres south of Mount Holland east of Hyden. May be found growing in yellow or white sand over laterite or on laterite capping, in shrubland vegetation.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|---------------------------|-------------|-------|-------------|---------------|-----------|
| 1* South of Mount Holland | 07/09/91 | Kon | VCL | Numerous | Unknown. |

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

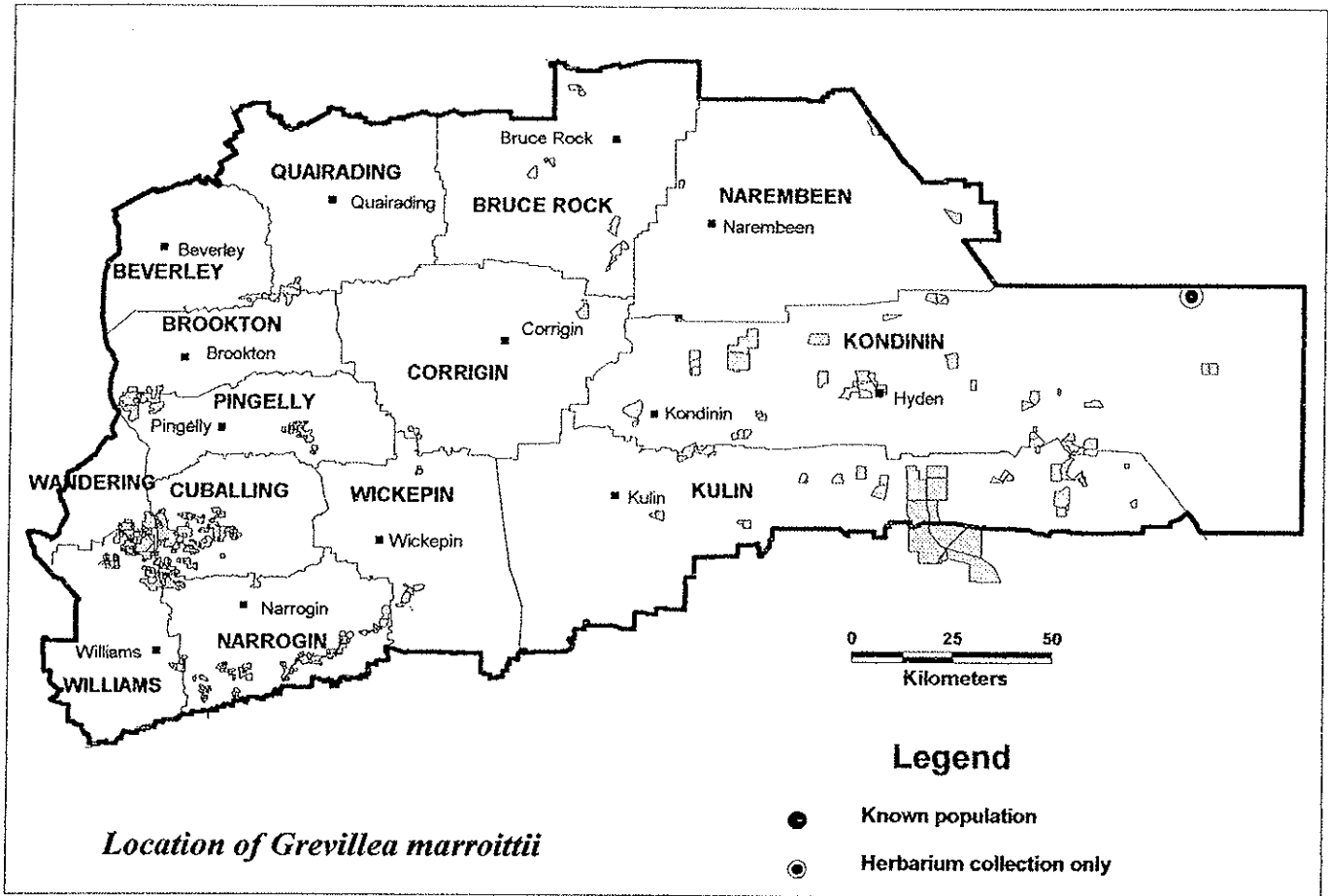
Management Requirements

– Nil until populations relocated.

Research Requirements

- Survey to relocate known populations in the District.
- When relocated survey for new populations in the area, on similar soil types, especially on Lake Cronin Nature Reserve.

References Olde & Marriott (1995).



Jacksonia quairading Chappill ms.

PAPILIONACEAE

A low scrambling, sparsely branching pea flowering shrub with grey cylindrical non spiny curved or bending stems. Small bracteoles persist below the calyx. The bud is widest towards the middle, with a short pedicel, ending abruptly in a small, slender point, non angular. The calyx hairs are coarse, cream to golden with the calyx lobes recurved at flowering, red-brown on inner surface, up to 11mm long. The calyx lobes cover the developing fruit, all split at the base, upright more or less circular with a short claw, orange with red markings, the wing orientation is horizontal. The wing shape is narrow ovate to elliptic, the wings as long as the keel. The keel is fused for the lower half of the margin, red to purple, anther yellow to orange. The ovary has a short stalk. The pod is flattened, somewhat woody with long woolly hairs. The pods drop off at or before maturity.

Flowering period: September - October.

Distribution and Habitat in the Narrogin District

Known from one population near Quairading growing on deep white sand. It grows underneath existing vegetation of heath and low scrub species of *Leptospermum*, *Eremaea*, *Petrophile*, *Grevillea*, and *Dampiera* species. It may be found growing in pale sand or sandy clay over laterite.

Conservation Status

Current: Priority 1[#]

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|---------------|-------------|-------|-------------|---------------|-----------|
| 1* Quairading | ? | Qua | RVM | ? | Chappill |

Qua Shire of Quairading
* population known only as Herbarium record

Response to Disturbance

Unknown. However, may respond favourably to fire and mechanical disturbance.

Susceptibility to *Phytophthora* Dieback

Unknown.

Management Requirements

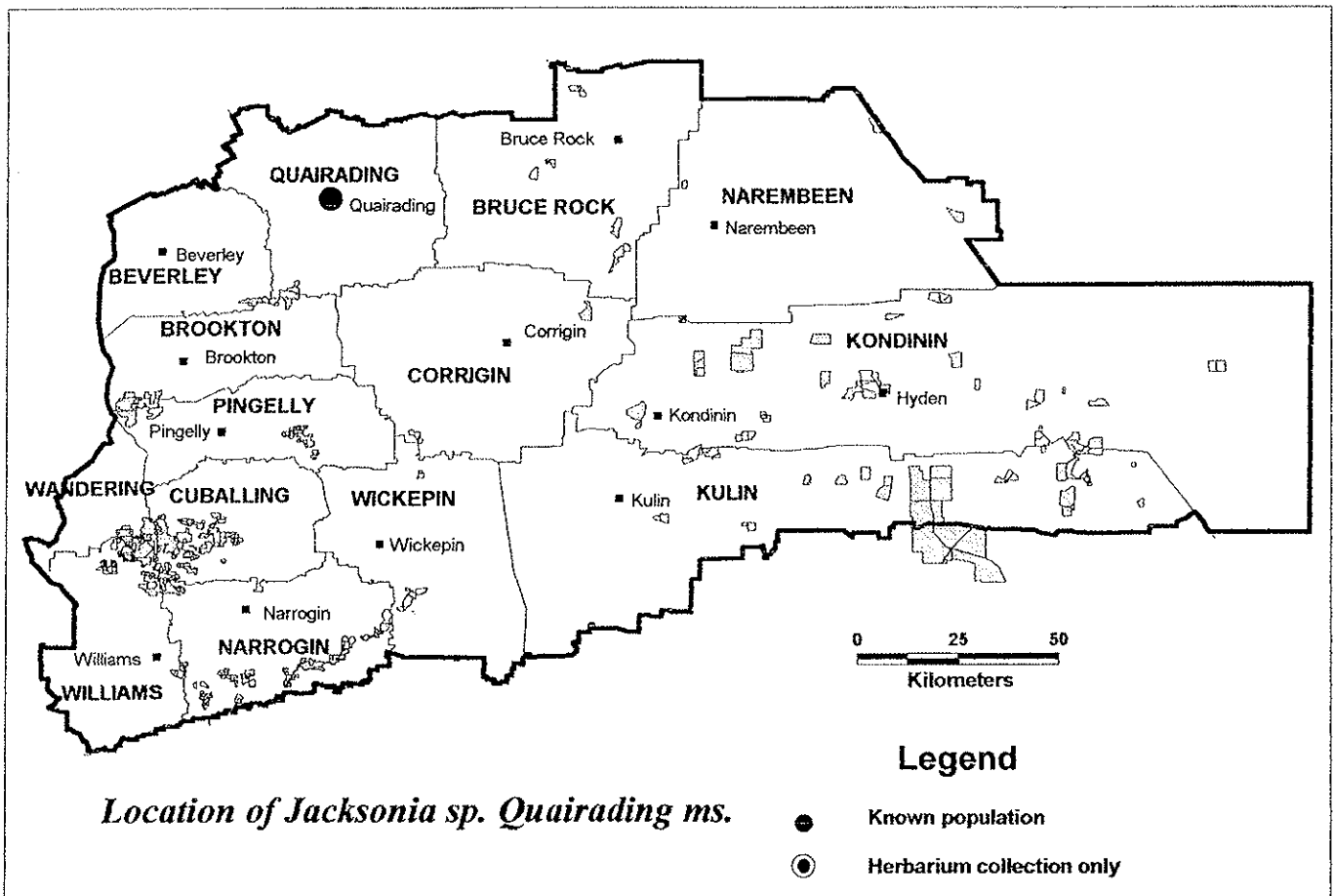
– Nil until population relocated.

[#] now Declared Rare Flora (updated at December 1999)

Research Requirements

- Survey to relocate population number 1. Obtain location information from J. Chappill.
- Survey for new populations on similar soil and vegetation types to verify species distribution.

References Chappill (Personal communication).



Microcorys cephalantha Conn

LAMIACEAE

M. cephalantha is a small shrub to 0.2 metres high with branches that lie along ground with erect new shoots. Dense hairs occur along a narrow longitudinal region between the axil of leaf and next furthest node. The more basal internodes are sparsely hairy. The leaves occur in whorls of 3 and are 10-12.5 mm long x 2.5-4 mm wide, stalkless, hairless or with a few scattered hairs, and multicellular hairs near or on margin. The leaf base is narrowly wedge-shaped, the leaf margin without teeth or lobes, the leaf end is blunt. The flower heads are up to 10-flowered. The pedicel is 0.3-0.5 mm long and densely hairy. The corolla white with maroon spots up to 6-8 mm long, the hood yellow with red-brown internal spots.

The species has close affinities with *M. capitata*, however, is readily distinguished by the narrowly obovate sessile leaves, and the narrowly wedge-shaped leaf base.

Flowering period: November.

Distribution and Habitat in the Narrogin District

Known only from near Jitarning, south west of Kulin, in sandy loam with lateritic gravel and in laterite growing under bushes in association in a closed heath community.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|--------------|-------------|-------|-------------|---------------|-------------------------|
| 1 Jitarning | 03/11/93 | Kul | RVM | 3 | Healthy |
| 2* Jitarning | 03/11/94 | Kul | ?NR | Nil | Unknown. -Not Relocated |
| 3 Jitarning | 03/11/94 | Wic | RVS | 7 | Healthy |

Kul Shire of Kulin

Wic Shire of Wickepin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

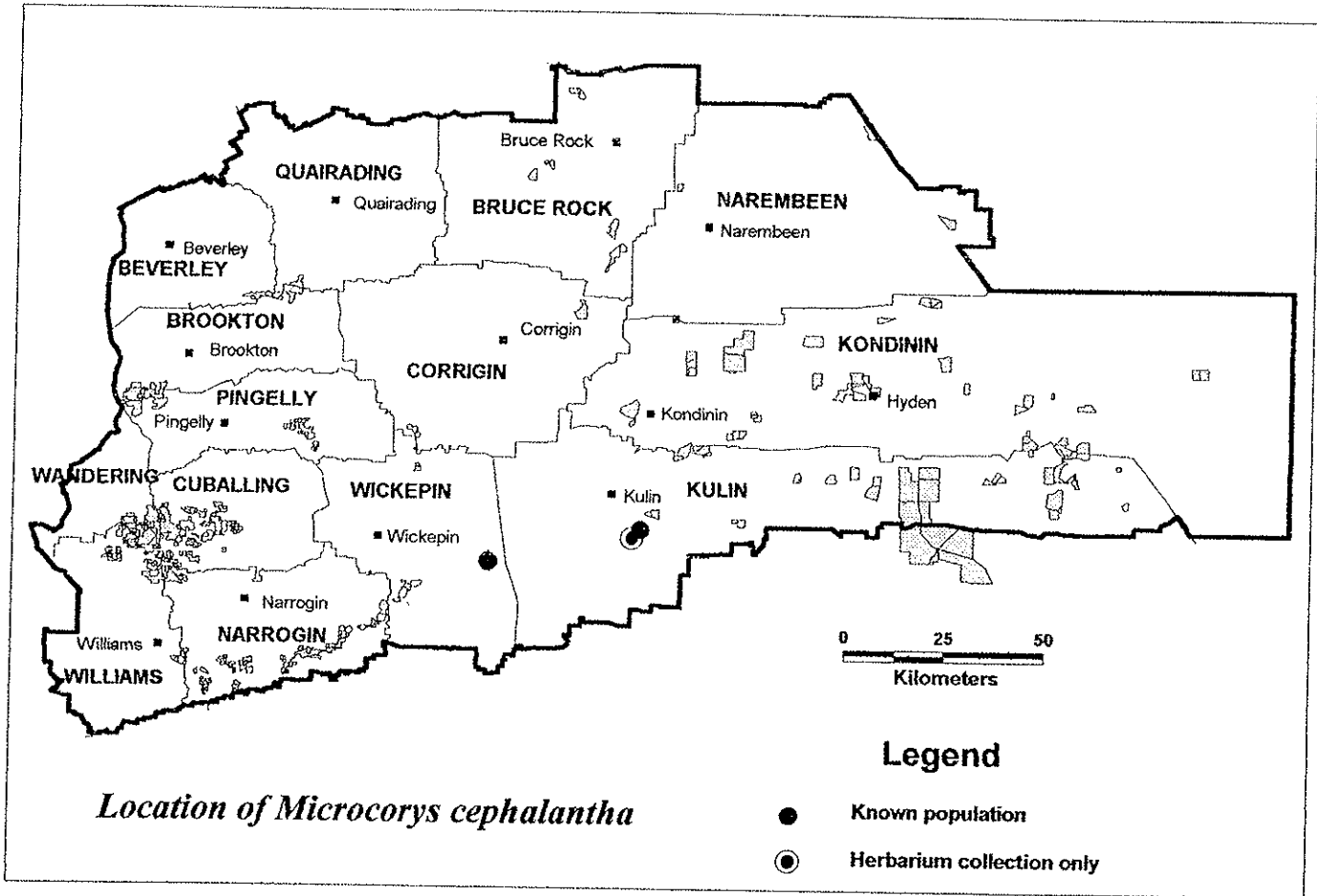
Management Requirements

– Monitor known populations annually. Plants may be difficult to locate.

Research Requirements

- Survey for new populations within its known range, on similar soil and vegetation types.

References Conn (1986).



Muelleranthus crenulatus Lee

PAPILIONACEAE

M. crenulatus is a small spreading herbaceous pea flowering plant with perennial underground parts. The stems are up to 8 cm long with sparse, softly spreading hairs up to 1 mm long. Three compound clover shaped leaves spread from a slender petiole, the leaves including the petioles are up to 2 cm long. The leaflets are wedge-shaped 1.5-7 mm long and 1-5 mm broad with a small point in the shallow marginal recess. The leaf margins are toothed with a few lateral veins ending in the points. The leaf blade is hairless above and more or less sparsely hairy below. Stipules are absent. The flower heads comprise of 1-3 flowers in a leaf-opposed raceme. The pea flowers are brown and yellow. The ovary is hairy, style slender and with a minute terminal stigma.

The species name is derived from Latin, having the leaf margins divided into fine teeth.

Flowering period: July.

Distribution and Habitat in the Narrogin District

M. crenulatus has only been collected from one location in 1969 from south of Mount Holland in the Forrestania area growing on stony red loam on a recently burnt area.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|------------------|-------------|-------|-------------|---------------|--------------------------|
| 1* Mount Holland | 15/09/93 | Kon | RVS | ? | Unknown.-Not Re-located. |

Kon Shire of Kondinin
* population known only as Herbarium record

Response to Disturbance

M. crenulatus may need fire to regenerate. Otherwise, its response to other environmental factors is unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

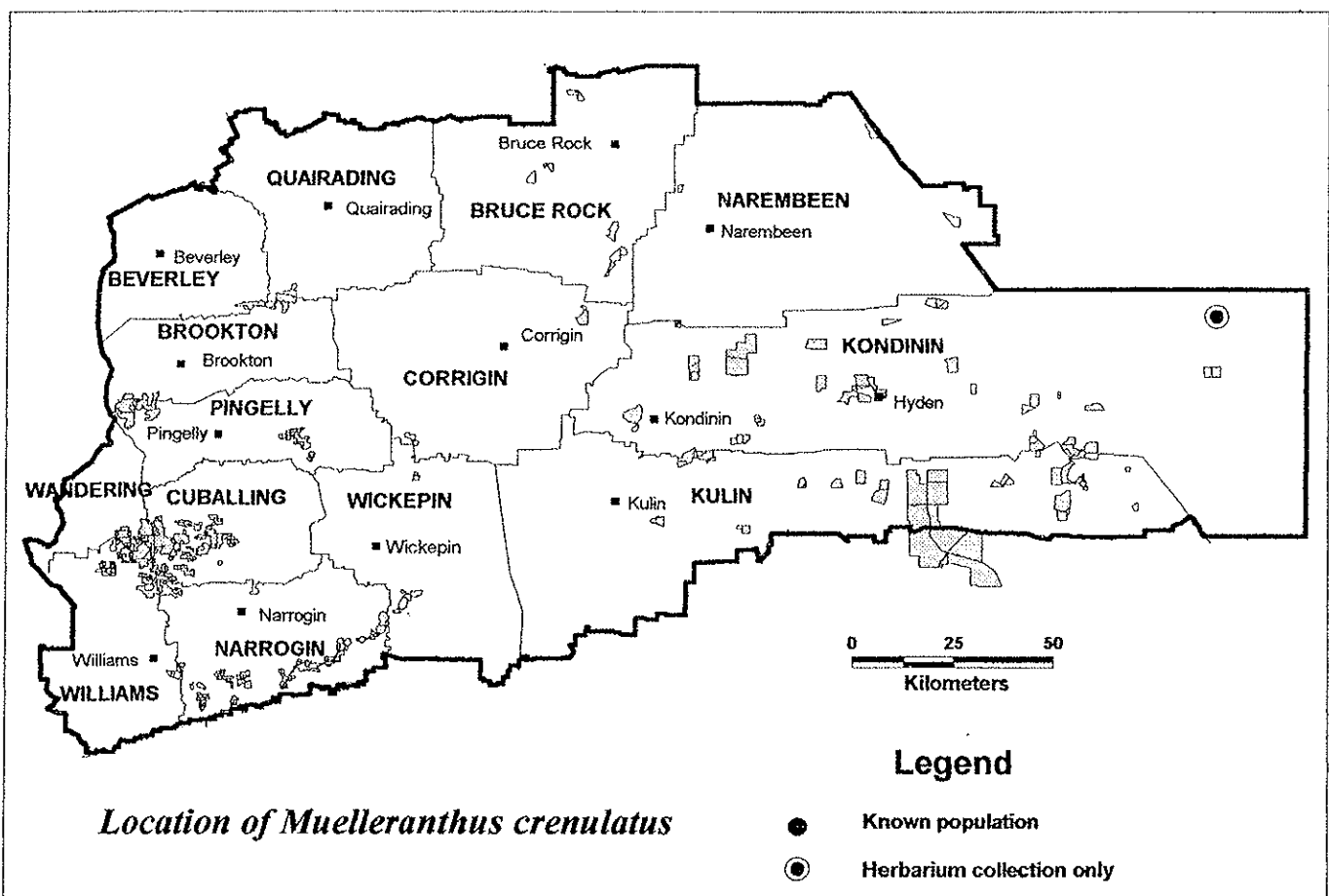
Management Requirements

- No requirement until re-located.

Research Requirements

- Undertake surveys to re-locate population number 1.
- Survey for this plant in the 1994 burnt area, in the Forrestania area including Lake Cronin Nature Reserve, during the flowering period on Mafic Amphibolite geological type.

References Lee (1973).



Neofuscelia scabrosina Elix

PARMELIACEAE

A 8 cm wide lichen with the main body of the plant being leafy and moderately fused. The 1 - 3 mm wide lobes are discrete or may partly overlap and are irregular to nearly linear - elongate in shape. The upper surface is olive - brown to dark brown to black - brown in colour, dull, markedly wrinkled or slightly shiny and smooth at the lobe apices. The lower surface is pale tan to light brown in colour, sometimes darkening at the lobe apices. The species may be confused with *N. luteonotata* since both species can occur on soil and have a similar overall shape, the major differences being chemical.

Distribution and Habitat in the Narrogin District

Known only from one locality at Camel Peaks, which is north - east of Hyden. It may be found growing on soil and termite mounds at the base of a rock outcrop.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|----------------|-------------|-------|-------------|---------------|-----------|
| 1* Camel Peaks | 24/05/72 | Kon | WAR | Unknown. | Sammy N. |

Kon Shire of Kondinin

* population known as a WA Herbarium record.

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

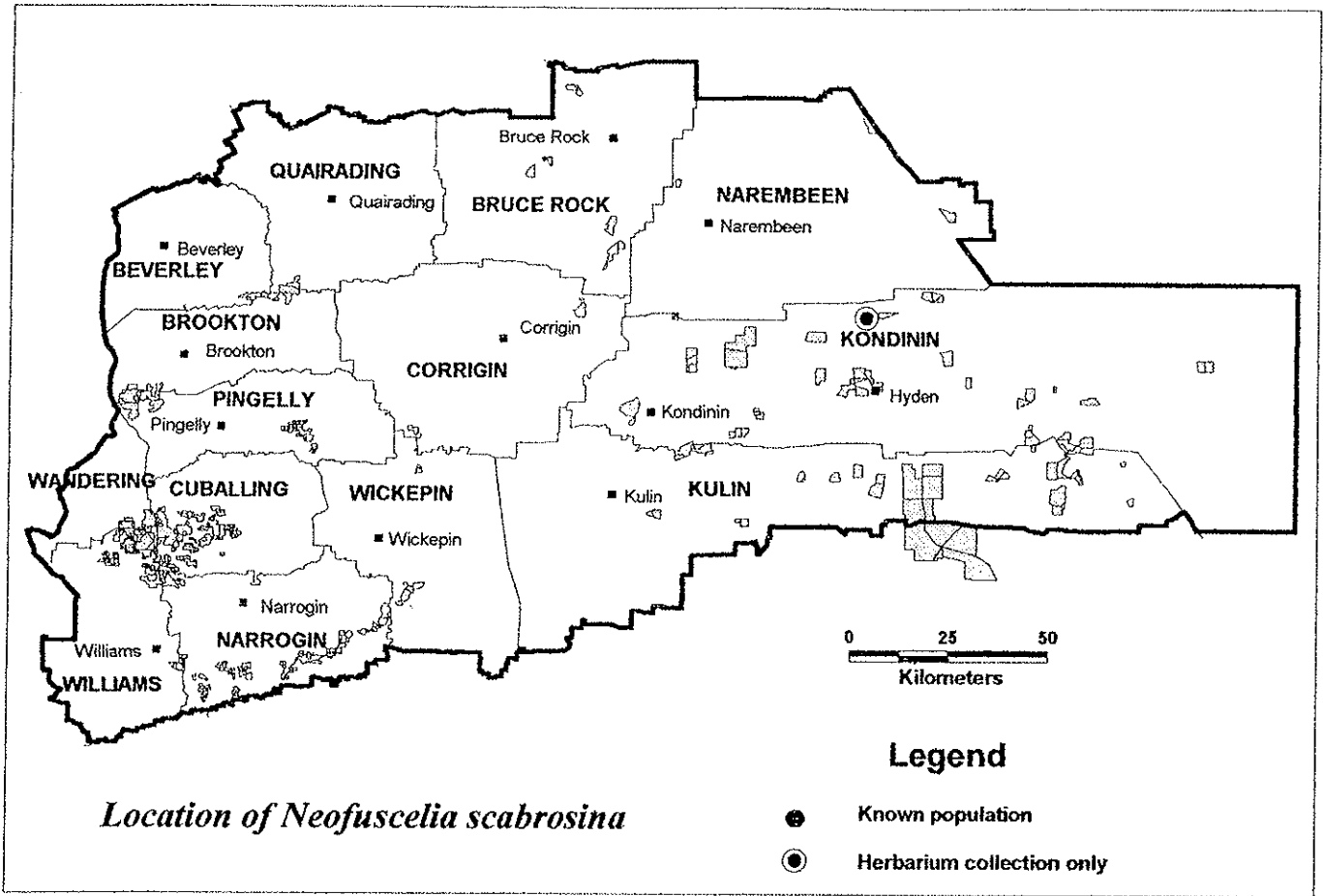
Management Requirements

- Nil until populations relocated.

Research Requirements

- Obtain original collection information concerning the location of population number 1. It may be difficult to survey given its similarity to another species.
- When relocated, determine the need to re-survey the population.

References Elix (1993).



Paraparmelia sammyi Elix & Johnst.

PARMELIACEAE

A rare lichen, forming irregular rosettes up to 6 cm wide, the main body of the plant is leafy and loosely to moderately fused. The 0.3 - 0.6 mm wide lobes are rarely overlapping, and are revolute, twisted and linear - elongate shaped. The upper surface is convex, lead grey in colour with black margins toward the lobe apices. The lower surface is pale tan to brown in colour, darker toward the lobe apices. This species may be characterised by the narrow, linear elongated lobes which are revolute and twisted so that often the lower surface is seen from above.

Distribution and Habitat in the Narrogin District

A rare species only known from its type locality 20 kilometres east of Narrogin on the road to Harrismith. It may be found growing on granite rocks.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|------------------|-------------|-------|-------------|---------------|----------------|
| 1=* Yilliminning | 18/08/87 | Nar | SR | Unknown. | Elix & Sargent |

Nar Shire of Narrogin

=* Herbarium specimen not stored in WA Herbarium.

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

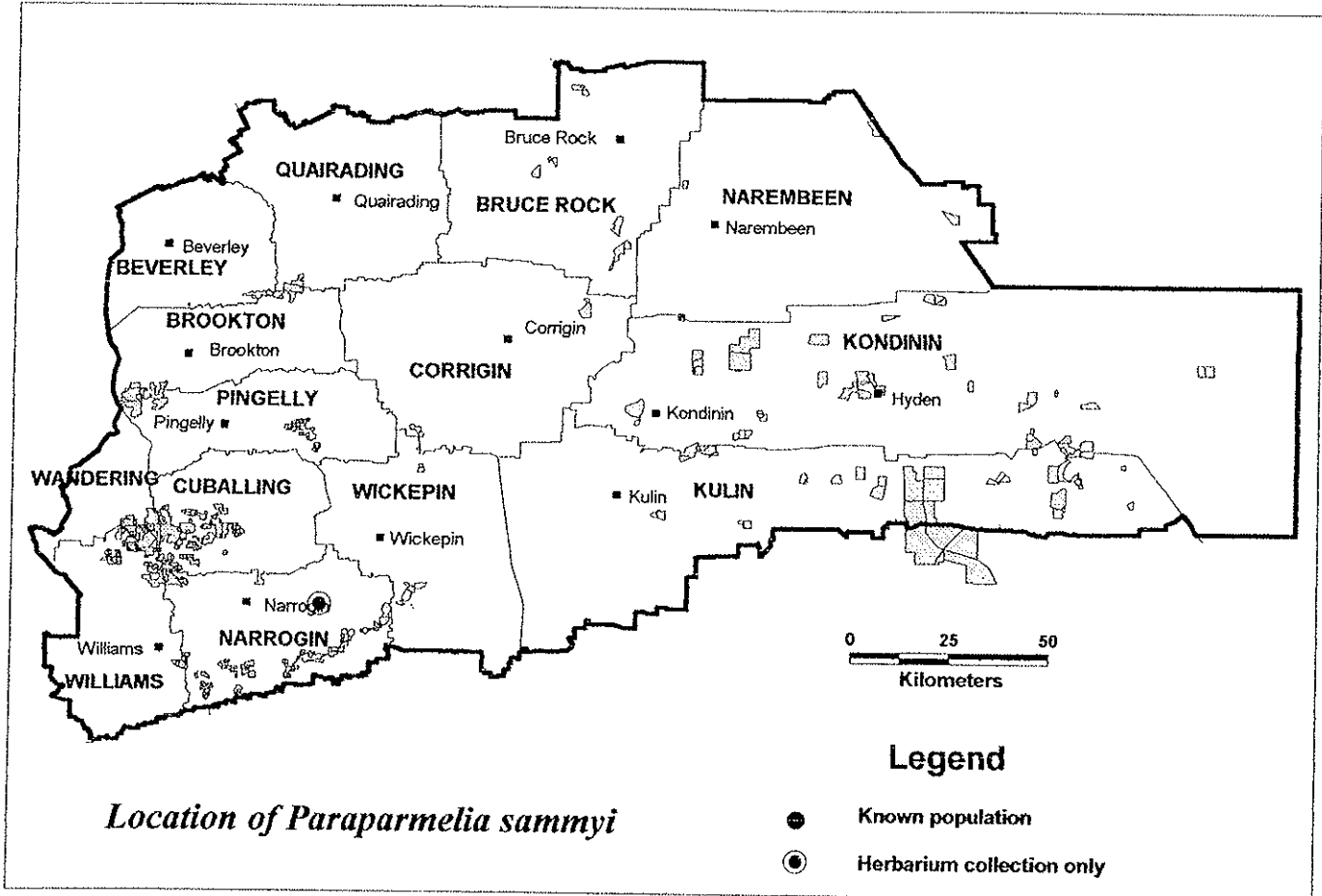
Management Requirements

- Nil until populations relocated.

Research Requirements

- Obtain original collection information concerning the location of population number 1.
- When relocated, determine the need to re-survey the population.
- Seek to have voucher material stored in the W.A. Herbarium.

References Elix (1988).



Paraparmelia sargentii Elix & Johnst.

PARMELIACEAE

A rare lichen that forms irregular rosettes to 3.5 cm wide, the main body of the plant is small, leafy and loosely to moderately fused. The lobes are 0.3 - 0.6 mm wide and rarely overlap and radiate from the apices. The convex upper surface is pale ash grey in colour with black margins toward the lobe apices, smooth and shiny at the lobe apices, becoming dull. The lower surface is pale tan to brown in colour but darker toward the lobe apices. The species may be characterised by the tiny rosettes with the pale ash, narrow radiating lobes, (0.3 - 1 mm) wide and the pale lower surface.

Distribution and Habitat in the Narrogin District

Currently known only from the type locality, 20 kilometres east of Narrogin. It may be found in association with granite outcrops.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|------------------|-------------|-------|-------------|---------------|----------------|
| 1=* Yilliminning | 18/08/87 | Nar | SR | Unknown. | Elix & Sargent |

Nar Shire of Narrogin

=* Herbarium specimen not stored in WA Herbarium.

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

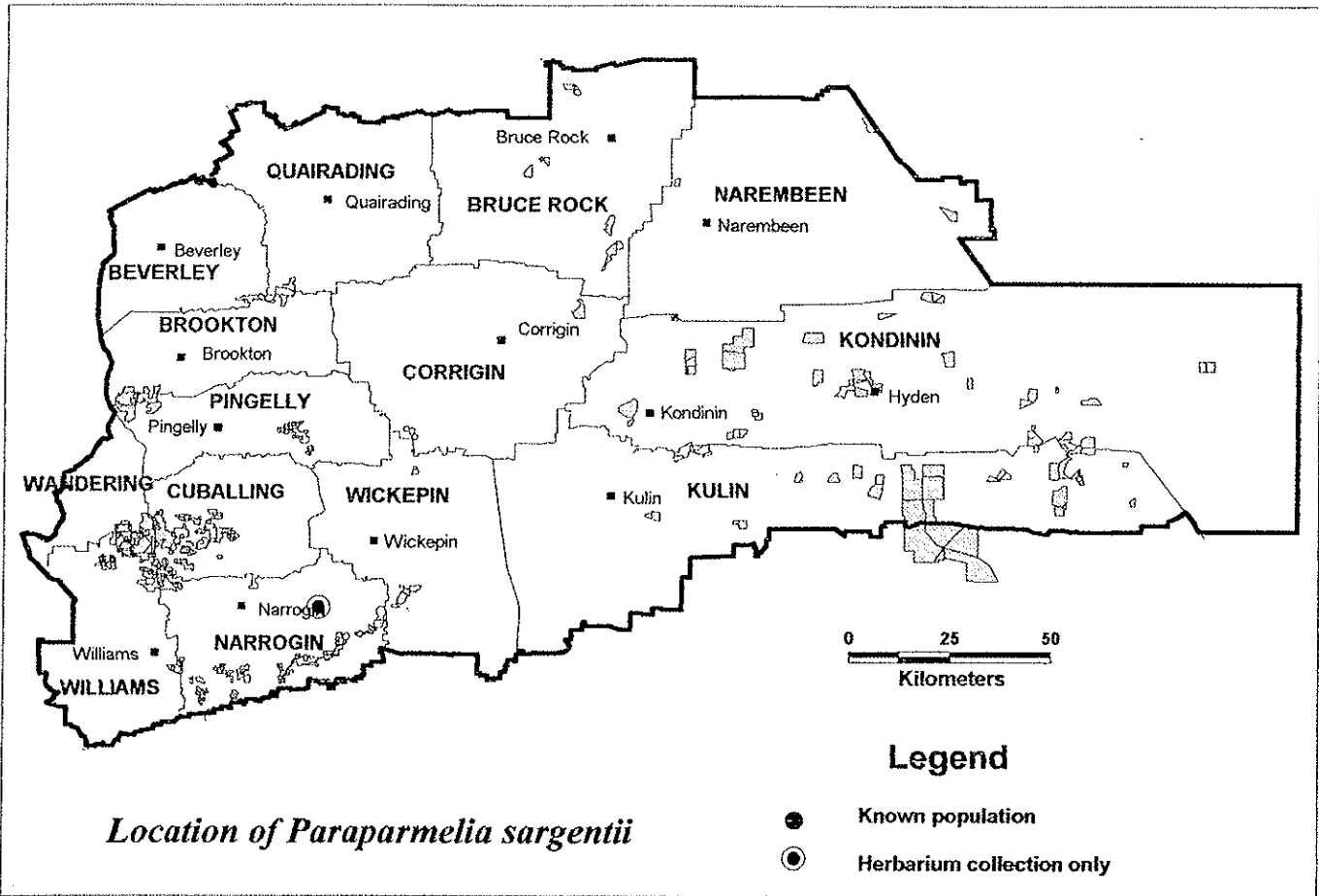
Management Requirements

- Nil until populations relocated.

Research Requirements

- Obtain original collection information concerning the location of population number 1.
- When relocated, determine the need to re-survey the population.
- Seek to have voucher material stored in the W.A. Herbarium.

References Elix (1988).



Stylidium rhipidium Erickson & Willis

STYLIDIACEAE

The Fan Trigger-Plant is a small, slender, slightly hairy annual about 5 cm tall. The few leaves form a basal rosette up to 2-4 cm long, smooth, reddish, almost oblong shaped. The very slender leafless, sparsely glandular-hairy, flower stalk has 1-2 dark coloured flowers, There are 2 or more hairless, green bracts. One bract is situated halfway along the stalk. The 5 mm calyx is greenish-red. The fan-shaped corolla is white, the larger petals 5-6 mm long, narrow at base and gradually widening. The column (stamens & style) are pale, short and slender, with black anthers. The species name refers to the fan shaped corolla.

Flowering period: October - November.

Distribution and Habitat in the Narrogin District

A widespread occurring plant, recorded from Mount Caroline, Cranbrook and west to Rocky Gully. Although only one herbarium collection is recorded for the Narrogin District the plant may occur in alluvium and colluvium valley fill, in wet flats, mud flats, along drainage, and on drainage affected aprons at the foot of granite rocks. May be associated with granitic soils.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|-------------|-------------|----------|-------------|---------------|-----------|
| 1* Williams | 30/10/52 | Williams | RVM | ? | Erickson |

Wil Shire of Williams

* population known only as Herbarium record

Response to Disturbance

May be affected by disturbance. Agricultural grasses, grazing and salt may affect the habitat of *S. rhipidium*. Grass species are common in most of the areas with suitable habitat.

Susceptibility to *Phytophthora* Dieback

Unknown.

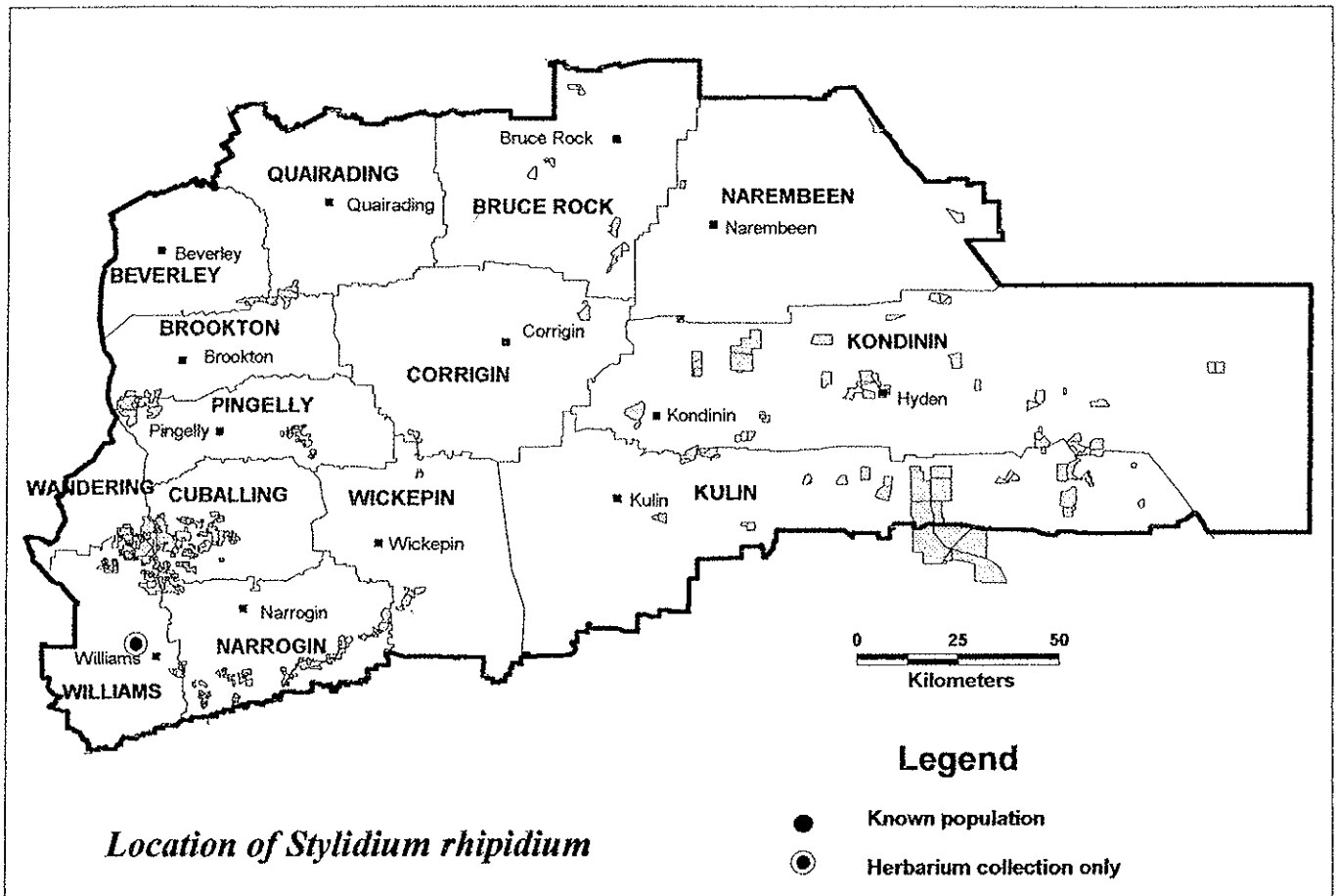
Management Requirements

– Nil until populations located in the District.

Research Requirements

- Survey for new populations. It is a small plant that may be easily overlooked. Survey non salt affected poorly drained quartz aprons alongside granite outcrops and other poorly drained colluvium and alluvial areas however, these may be more salt prone.

References Erickson. & Willis (1966).



A perennial trigger plant with erect or recurved linear leaves. The leaf mid-rib is visible on both surfaces. The 16-25 cm and 1-2.5 cm wide long hairless leaves arise in groups of 4 or 5 from a basal papery sheath. The margins are curved but not all the way. The densely glandular-hairy flower cluster is arranged like tufts of hair, including the 25-45 cm long scape. The flower stalks are about 3 cm long at base, shorter further up with 2-4 flowers per stalk. The 6 mm long, 2.3 mm wide hypanthium is densely glandular-pubescent. The corolla is pale-pink, vertically paired. The 1.2 mm long, 0.8 mm wide pale yellow labellum is smooth with an apical point, the margins reddish at the base, otherwise white. The throat with 2 wing-like appendages, is pink at base and red tipped.

Flowering period: September - October

Distribution and Habitat in the Narrogin District

Known only from the Ironcaps area occurring from Mount Holland to Digger Rock, growing in association with *Allocasuarina* - Mallee scrub on grey sand/laterite/heavy sandstone and at base of Mount Holland in Ironstone/laterite soil. Its preferred habitat is not recorded.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|----------------|-------------|-------|-------------|---------------|-----------|
| 1* Digger Rock | 20/10/88 | Kon | VCL | ? | Coates |

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

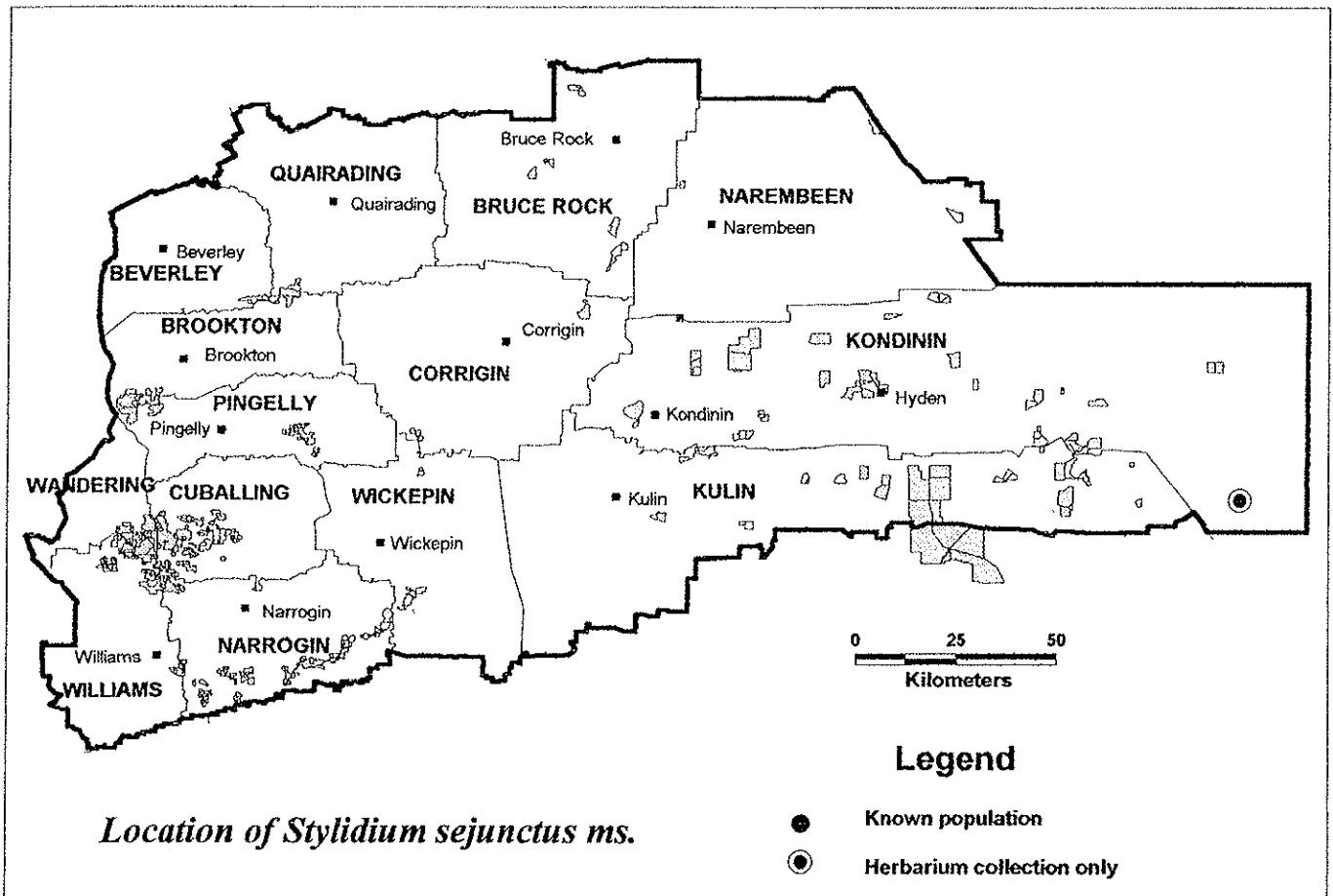
Management Requirements

- Review the current species distribution with D. Coates and A. Lowrie. The review may require a change of Priority status.

Research Requirements

- Survey for population number 1 and new populations and determine habitat preference. It is considered to be fairly common (D. Coates, personal communication).

References Lowrie (personal communication).



Symonanthus bancroftii (Mueller) Haegi

SOLANACEAE

S. bancroftii is a small, erect herbaceous undershrub from 15-25 cm high with many sticky moderately hairy ascending branches arising from or near a perennial thickened stem base. Because of its stickiness sand adheres to the stems and particularly the underside of the leaves. The leaves are egg-shaped, hairy and somewhat warty, 5-17 mm long and 1-3 mm wide, without stalks, with the edges rolled under. The flowers are white in colour, streaked with violet inside small and hairy. The fruit is a globular capsule, 3-4 mm long, 2.5-4 mm wide, 3-5 seeds. Seeds are 2 mm long and 1 mm wide. The plant will probably have the distinct aroma of tobacco.

The species name is in honour of Dr. Joseph Bancroft (1836-94) a Brisbane Pharmacologist.

Flowering period: September.

Distribution and Habitat in the Narrogin District

The most recent collection in the W.A. Herbarium was made in 1945 at Bruce Rock. It was also collected at Muntadgin and at Bending. No habitat information is available from any of the collections made. Sand grains still attached to the herbarium samples suggest a very fine sand or silt, suggesting an alluvium or colluvium soil type.

Conservation Status

Current: Priority 1[#]

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|---------------|-------------|-------|-------------|---------------|-------------|
| 1* Bending | 09/22 | Nar | ? | ? | Gardner |
| 2* Bruce Rock | 04/09/32 | Bru | ? | ? | Bailey |
| 3* Muntadgin | 09/45 | Nar | ? | ? | Bailey |
| 4* Cumminin? | 1892 | Nar | ? | ? | Heal (Melb) |

Nar Shire of Narembeen

Bru Shire of Bruce Rock

* population known only as Herbarium record

Response to Disturbance

Little is known about this plant however, the family Solanaceae frequently respond to natural or artificial habitat disturbances such as fire, overgrazing or road grading.

Susceptibility to *Phytophthora* Dieback

Unknown.

Management Requirements

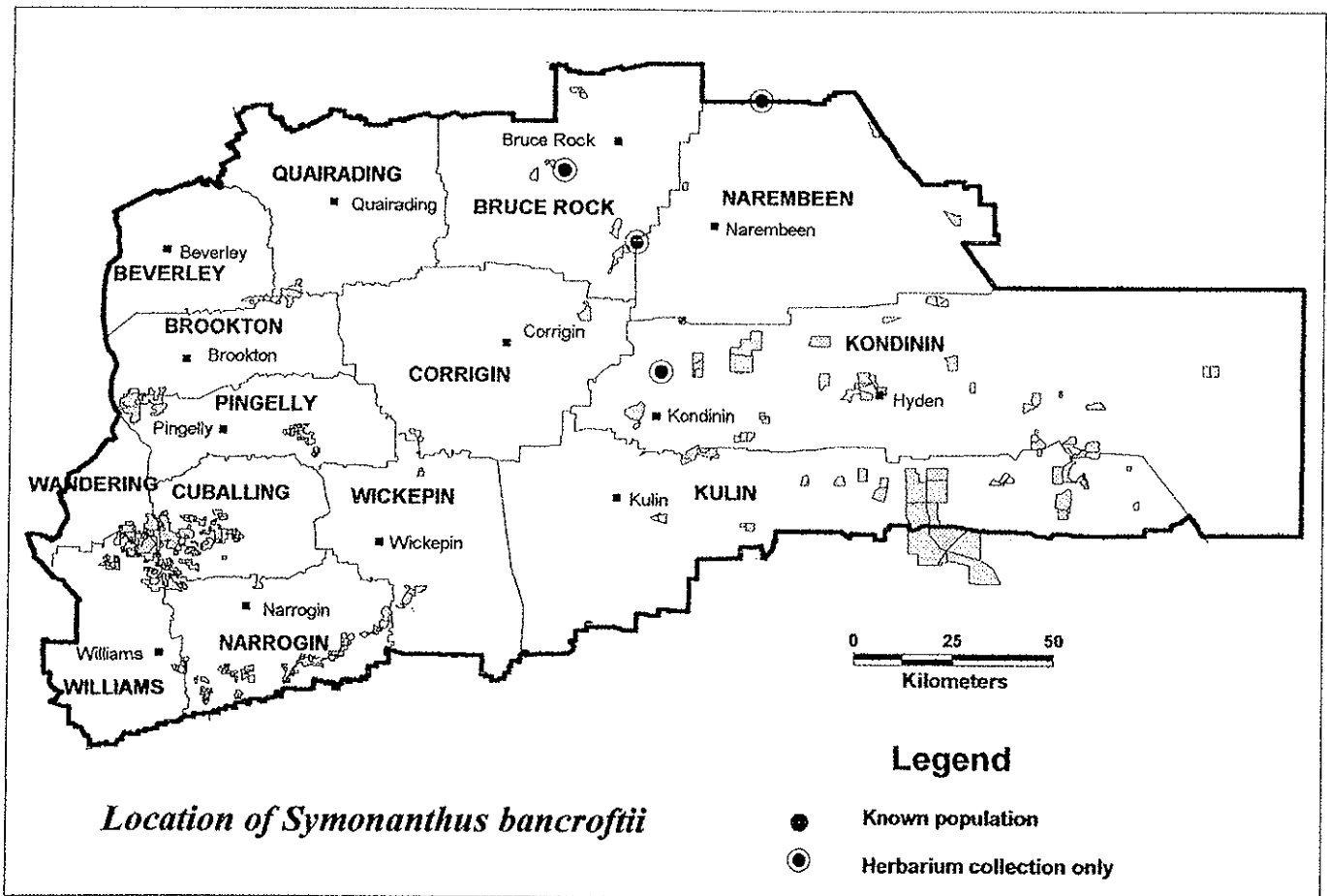
[#] now Declared Rare Flora (updated at December 1999)

- Nil

Research Requirements

- Specifically search suspected locations in the Bending, Bruce Rock and Muntagin areas.
- Maintain awareness of this species during general flora surveys.

References Haegi, (1981), Muell. (1882), Leigh, Boden & Briggs (1984).



Verticordia multiflora Turcz **subsp. solox** A.S. George

MYRTACEAE

An open and irregularly branched feather flowering shrub to 50 cm tall with one to several basal stems. The blunt and often minutely toothed, 2-4 mm long leaves are oblong to elliptic, semi-cylindrical to concave. The erect to spreading flowers are bright yellow in rounded groups. The sepals are 5-6 mm long. The petals 3.5-5 mm long. The hypanthium is hairy. The 4-5.3 mm long style is hairy. *V. multiflora* subsp. *solox* is characterised from *V. multiflora* subsp. *multiflora* by its shorter leaves, slightly larger flowers and sepals that are divided into more numerous and coarser fringes. The subspecies name refers to the shaggy, rough fringe on the sepals.

Flowers: October - December.

Distribution and Habitat in the Narrogin District

Widely distributed from south east of Merredin to south east of Hyden. It occurs in pale yellow sand, gravelly sand and sand over laterite or granite soils, in tall open shrubland with *Acacia* sp., *Melaleuca uncinata*, *Leptospermum* sp., *Baeckea* sp., and other *Verticordia* species.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|---------------------|-------------|-------|-------------|---------------|---------------|
| 2* W of Lake Cronin | 08/12/64 | Kon | ?VCL | ? | Not relocated |
| 4 Rabbit Fence | 09/12/93 | Kon | RVS | Abundant | Healthy |
| 5* NE of Hyden | 02/01/88 | Kon | ? | ? | Not relocated |
| 7 Holland Track | 10/12/93 | Kon | VCL | Comm/Patches | Healthy |
| 9 Dragon Rocks | 1991 | Kul | NR | Rare | Unknown. |

Kon Shire of Kondinin

Kul Shire of Kulin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

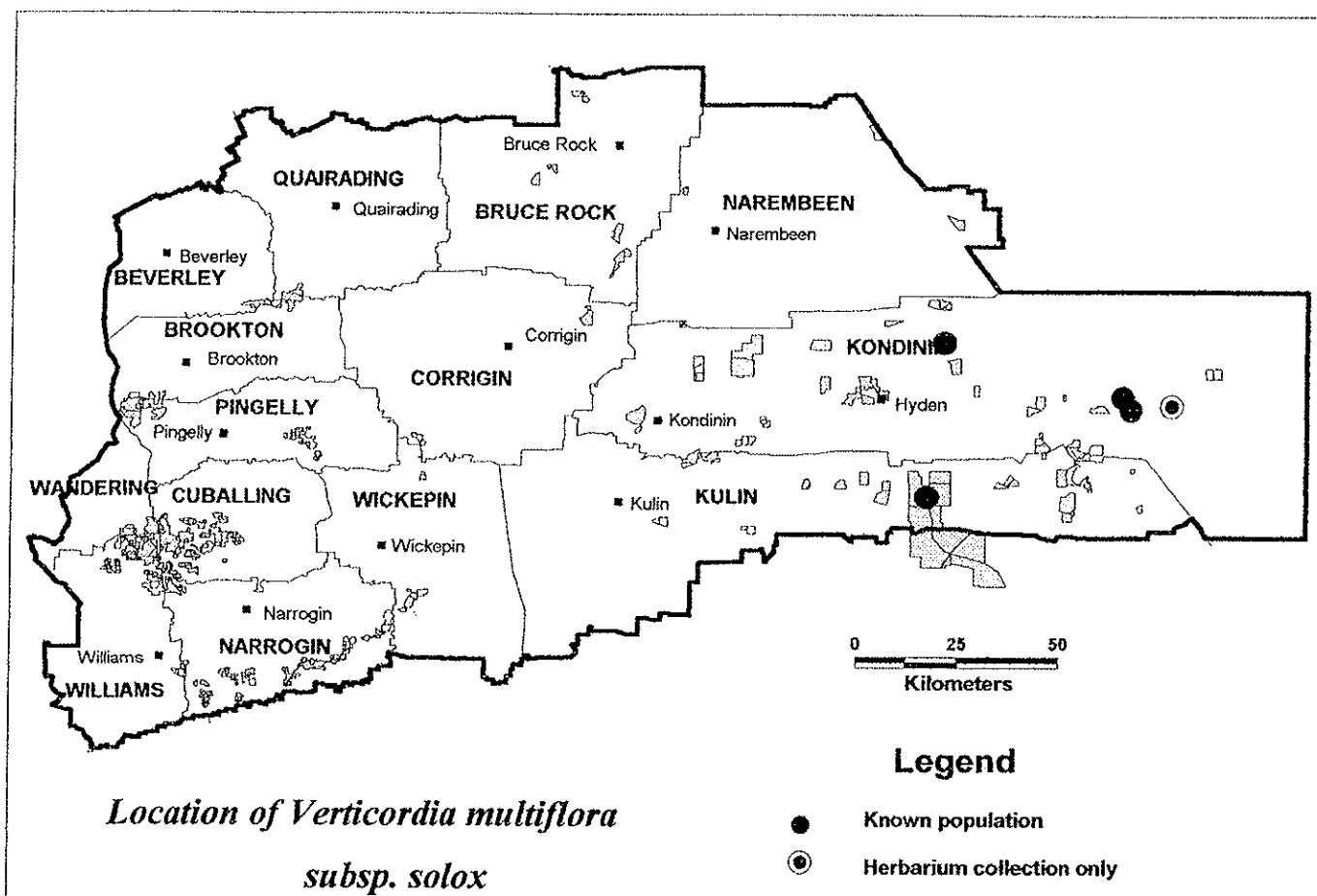
Management Requirements

– Monitor known populations occasionally.

Research Requirements

- Survey opportunistically, on yellow sand plain in Vacant Crown Land and conservation reserves east of Hyden.

References George (1991) Turczaninow (1847).



Xanthoparmelia nashii Elix & Johnst.

PARMELIACEAE

A lichen, 5-6 cm wide that inhabits granite rocks. The body of the plant is leafy and fused. The 1 -2 mm lobes may or may not overlap each other and are irregularly branched. The upper surface is yellow - green in colour, darkening, flat to slightly curved inward, shiny near the apices, and smooth. The lobe margins are often blackened. The lower surface is flat, dull, smooth, and black. It is characterised by the narrow lobes with a black lower surface.

Distribution and Habitat in the Narrogin District

A very rare species known only from two localities, one north - east of Hyden. It may be found growing on granite rocks in the sub-arid area of Western Australia.

Conservation Status

Current: Priority 1

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|-----------------------|-------------|-------|-------------|---------------|------------|
| 1 =* Hyden north east | 08/08/81 | Kon | Unknown. | Unknown. | T. H. Nash |

Kon Shire of Kondinin

=* Herbarium specimen stored in WA Herbarium.

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

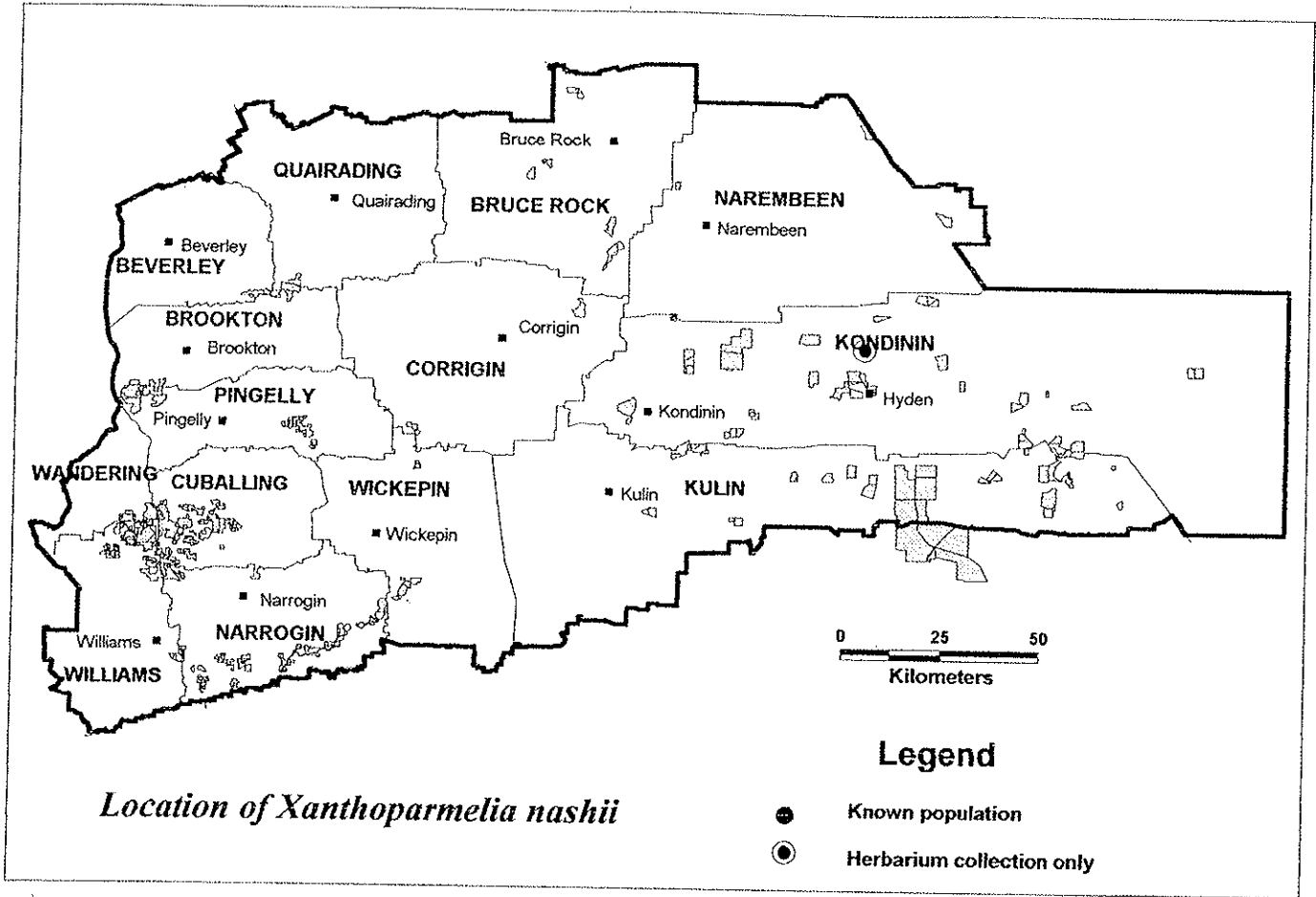
Management Requirements

- Nil until populations relocated.

Research Requirements

- Obtain original collection information concerning the location of population number 1.
- When relocated, determine the need to re-survey the population.
- Seek to have voucher material stored in the W.A. Herbarium.

References Elix (1986).



B. Priority Two Taxa

***Acacia alocophylla* A.R. Chapman & Maslin
subsp. *compressa* A.R. Chapman & Maslin ms.**

MIMOSACEAE

A dense, spreading shrub to 2 metres high with zigzagging branchlets. The long and narrow, flattened, curved, 4-13 cm long and 2-3 mm wide phyllodes have midrib and marginal nerves. The phyllodes do not continue down stem in raised lines as in related species. The bracteoles taper suddenly to a point. The golden, 5-7 mm long and 4-6 mm diameter flower heads are stalkless with two per axil. Flowers have four parts. Legumes are straight, appearing beaded and brittle. The seeds are glossy, dark brown with a terminal yellowish fleshy appendage. The sub species name refers to the flattened appearance of the phyllodes.

Flowering period: August

Distribution and Habitat in the Narrogin District

A. alocophylla subsp. *compressa* ms. is recorded from Bruce Rock to Holleton with another two populations near Ballidu. It is found growing in yellow loam, sand, sandy loam and loamy clay in open low scrub and heath. It appears to favour Colluvium soils.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | LAND STATUS | No. of plants | Condition |
|---------------|-------------|-------|-------------|---------------|---------------|
| 3* Bruce Rock | 06/10/93 | Bru | RVS | Nil | Not relocated |
| 4* Bruce Rock | 5/'32 | Bru | ? | | Not relocated |
| 5* Bruce Rock | 9/'33 | Bru | ? | | Not relocated |
| 6 Bruce Rock | 06/10/93 | Bru | RVM | 6 | Healthy |
| 7* Holleton? | 09/09/86 | Nar | NR | | Unknown. |
| 8* Muntadgin | 06/10/94 | Nar | RVS | Nil | Not relocated |

Bru Shire of Bruce Rock

Nar Shire of Narembeen

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

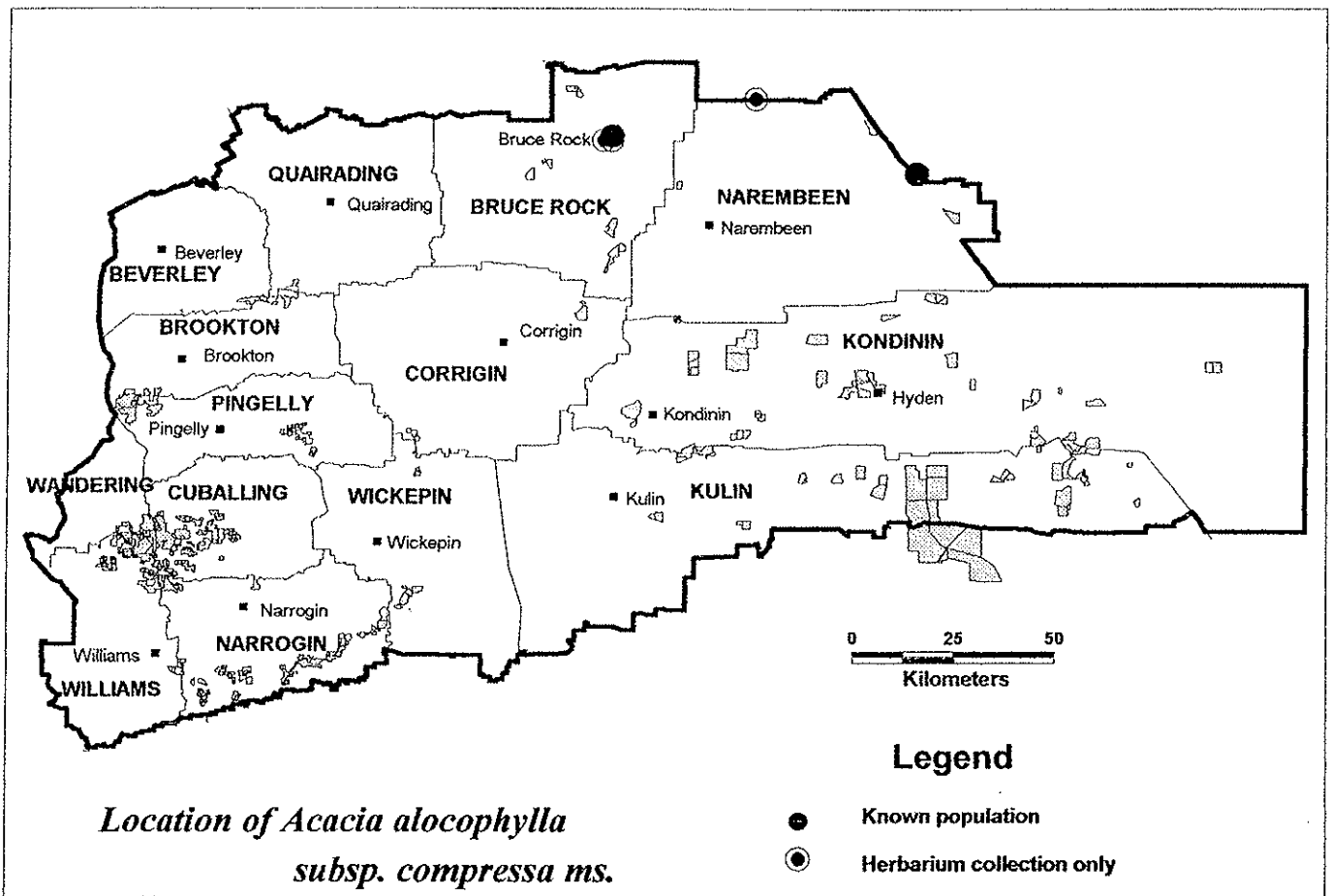
Management Requirements

— Monitor known populations.

Research Requirements

- Survey to relocate population number 7.
- Survey for additional populations on conservation reserves. There are numerous reserves in the area with colluvium soil types to survey.

References Chapman & Maslin (personal communication).



A low rounded shrub 0.4-0.8 metres tall, spreading to 1.3 metres with dark grey bark with longitudinal fissures exposing a light brown under-layer. The mostly hairless, dull reddish-grey branchlets have four resinous ridges. The stipules are 0.5-0.9 mm long, triangular, hairless and persistent. The 35-60 mm long, 0.6-1.25 mm diameter resinous phyllodes are light-green to grey-green, spreading but curving upward, sometimes in a semi-circle. They are cylindrical, the tip sometimes recurved, with 8 grooves. The peduncle is 0.5-1 mm long with 2 per node. The medium-yellow, 4-6 mm long, 4-5 mm diameter globe shaped flower heads are 13-15 flowered. The flowers have 4-parts. The ovary is densely silky. The 24-60 mm long, 1.5-2 mm wide, resinous legume is straight and slightly raised over and constricted between seeds. The manuscript name refers to the phyllodes that are curved like a bow.

Flowering period: July - September.

Distribution and Habitat in the Narrogin District

Widely distributed from the Moora CALM District, near Kulin to Hyden, in the Narrogin District and south to Nyabing in the Katanning District. It grows on brown sand and brown sandy loams, usually in mallee scrub with *Eucalyptus* or *Allocasuarina* and occasionally in low heath. It appears to favour colluvium and alluvium geological soil types.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-------------------|-------------|-------|-------------|---------------|---------------|
| 3* Kulin | 08/10/93 | Kul | RVS | Nil | Not relocated |
| 4* Kondinin | 14/12/76 | Kul | ? | ? | Unknown. |
| 5* Kulin | 08/10/93 | Kul | RVS | Nil | Not relocated |
| 6* Hopkins ? | 03/11/93 | Kul | NR? | Nil | Not relocated |
| 7* South Kumminin | 27/07/63 | Kon | ? | ? | Unknown. |
| 8* Camel Peaks | 28/04/94 | Kon | RVS | Nil | Not relocated |
| 9* Sedgewicks | 04/05/94 | Kon | PP | ? | Unknown. |

Kul Shire of Kulin

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

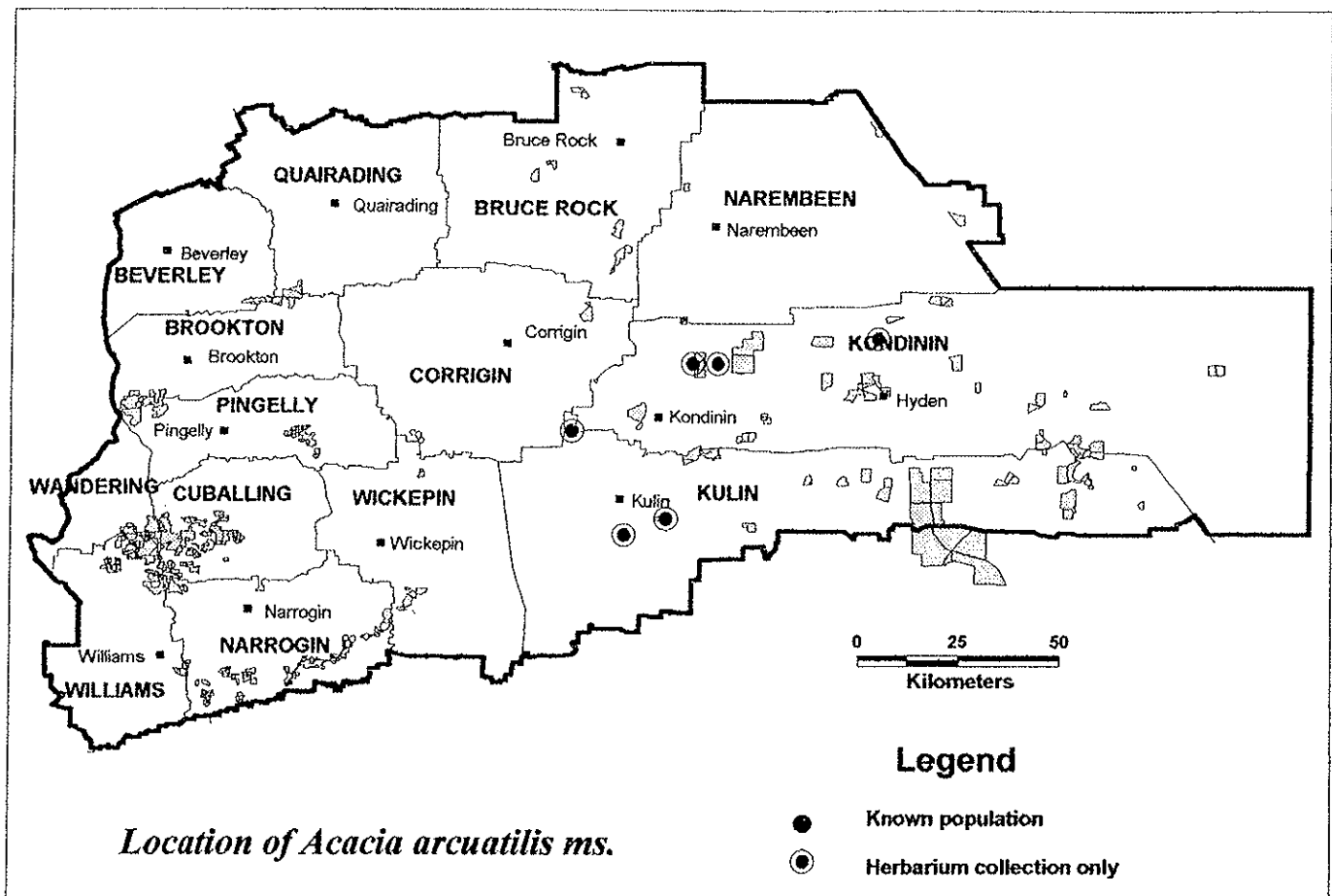
Management Requirements

- Nil until populations relocated.

Research Requirements

- Survey opportunistically, on conservation reserves with similar habitat.

References Cowan & Maslin (personal communication).



Acacia asepala Maslin ms.

MIMOSACEAE

A. asepala ms. is a rigid, spreading, perennial, woody shrub, 0.5-1.5 metres tall and 1-1.7 metres wide, resembling a mid-dense ball of prickles. The branchlets are hairless and red-brown at extremities. The older branches age to light grey. The 5-sided, thick needle like phyllodes are cylindrical and slightly tapered, 1-2.5 cm long, about 1 mm wide, rigid, and 5-nerved. The phyllodes fall easily from the plant and stick to skin or clothing when brushed against. The small globular golden flowers have 5 parts and the calyx is absent. The phyllodes resemble those of *A. colletioides* except they are only 5-nerved and lack prominent stomata.

Flowering period: August to September

Distribution and Habitat in the Narrogin District

In the Narrogin District one population occurs near Lake Cronin, east of Hyden. Other populations outside the District occur from near Marvel Loch, and the Frank Hann National Park. It grows on loam or sandy loam soils in open *Eucalyptus* woodland.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|---------------|-------------|----------|-------------|---------------|-----------|
| 1 Lake Cronin | 10/12/93 | Kondinin | VCL | 200+ | Healthy |

Kon Shire of Kondinin
* population known only as Herbarium record

Response to Disturbance

The response to disturbance is unknown. The Lake Cronin population is an undisturbed site.

Susceptibility to *Phytophthora* Dieback

Unknown.

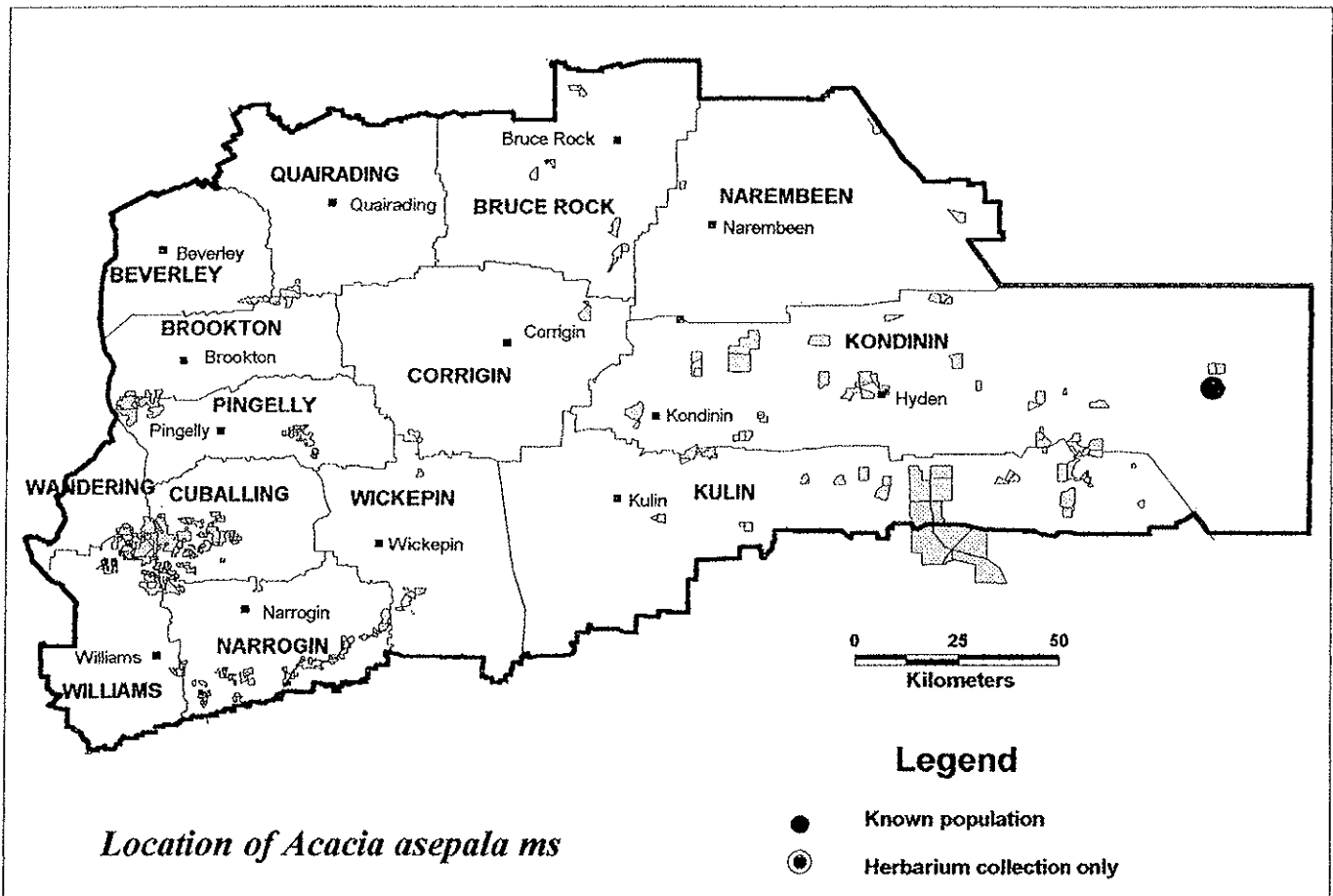
Management Requirements

- Monitor known population occasionally.

Research Requirements

- Survey for new populations in *Eucalyptus* woodlands in the Forrestania - Southern Cross Road area on alluvium geological types. Suitable soils may include, silt, sand and gravel sheet wash areas on lower slopes.

References Maslin (personal communication).



Acacia campylophylla Bentham

MIMOSACEAE

A. campylophylla is a small rigid, bushy shrub to 35 cm tall. The branchlets are 3-angled. There are numerous phyllodes 1.2-3 cm long, 1-1.5 mm wide strongly recurved. They are rigid, narrow, cylindrical, tapering to a sharp point, with several strongly raised nerves. The stipules are small and spiny. The numerous, golden yellow flowers are spherical with narrow smooth petals. The narrow, flat, up to 3.7 cm long and 4-7.5 mm wide seed pod is strongly raised over the seeds. The species name refers to the strongly bent and curved phyllode.

Flowering period: June - September

Distribution and Habitat in the Narrogin District

All populations occur within a 80 kilometre radius of Cunderdin. The two locations in the Narrogin District are west and north-west of Corrigin. In the Narrogin District this plant has been found near populations of Declared Rare Flora, *Grevillea scapigera* and *Grevillea dryandroides* subsp. *hirsuta*. The habitat is scrub vegetation with *Calothammus* sp., *Hibbertia* sp, *Allocasuarina* sp. and *Dryandra speciosa*, often in old gravel pits, and on shallow yellow sand with gravel or laterite.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|--------------|-------------|-------|-------------|---------------|----------------------|
| 10 Austin Rd | 30/08/94 | Bro | RVS | Scatt/Comm | Healthy- |
| 11* Corrigin | 18/11/92 | Cor | RVS | ? | Unknown. |
| 12 Jubuk | 16/08/95 | Cor | VCL | 10 | On gravel pit floor. |

Bro Shire of Brookton

Cor Shire of Corrigin

* population known only as Herbarium record

Response to Disturbance

A. campylophylla may respond favourably to soil disturbance as indicated by growing on the floor of old gravel pits. Other responses to disturbance factors are unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

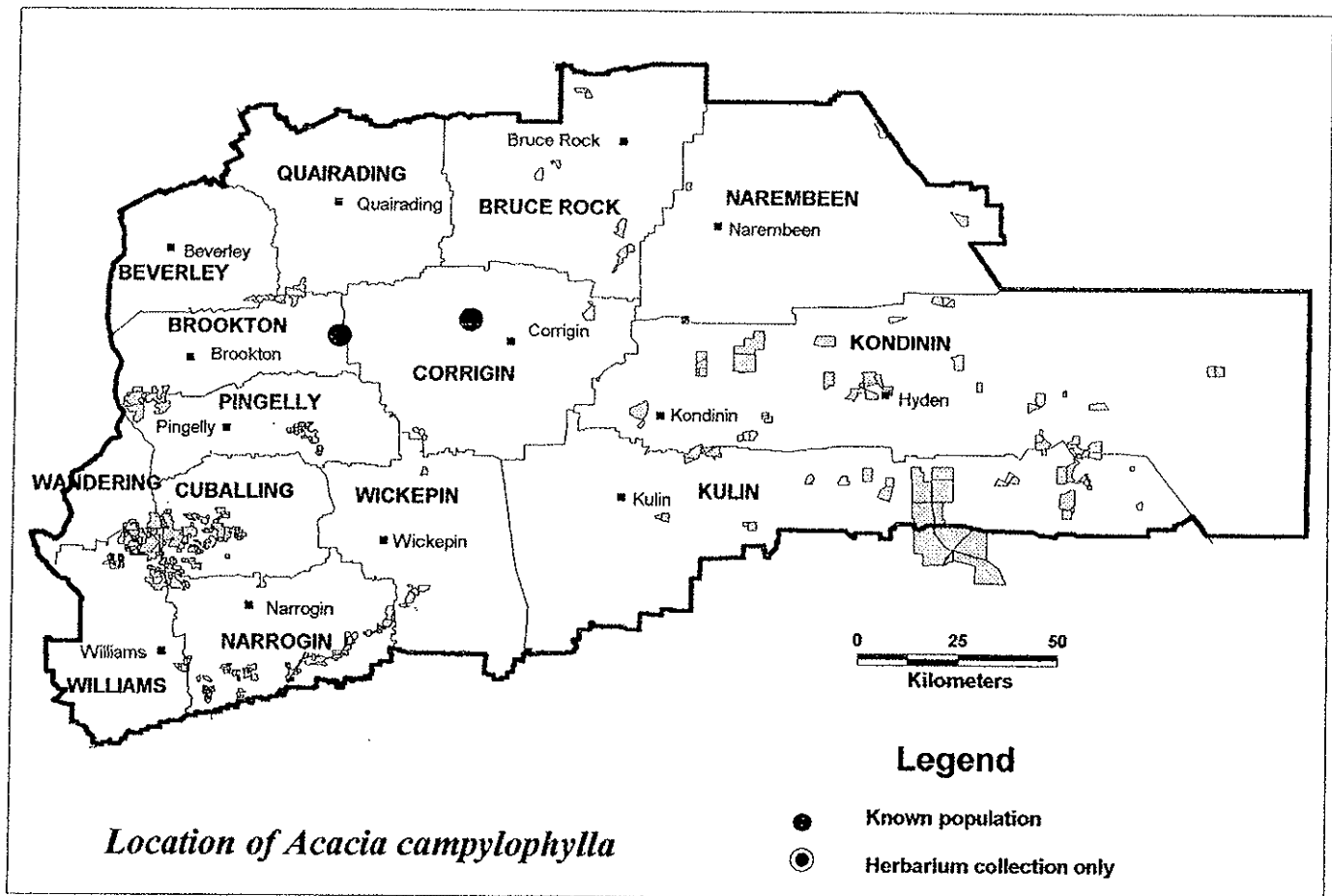
Management Requirements

- Monitor known populations bi-annually.
- Ensure Shire of Brookton protect population number 10 during roadside maintenance operations.

Research Requirements

- Survey to relocate population number 11.
- Survey for new populations on conservation reserves from within its known distribution on lateritic sand and laterite soils.

References Maslin (personal communication) Bentham (1855).



Acacia castanostegia Maslin ms.

MIMOSACEAE

A shrub, 0.7-1 metres tall and 1-2 metres in diameter with rigid, 2-3 cm long, quadrangular, sharp pointed phyllodes. The globular, 3-5 mm diameter flowers are in 5 parts with cream heads. The 4-5 cm long and 2-3 mm wide pods are long, and narrow with parallel edges, not contracted between seeds.

Flowering period: July - October

Distribution and Habitat in the Narrogin District

Occurs from north east of Southern Cross southwards to the Ironcaps near Forrestania and eastwards to Norseman. The habitat preference is unclear. However, it is known to occur on sand, loam and laterite soils in association with *Eucalyptus* woodland, scrub or heath vegetation.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|------------------|-------------|-------|-------------|---------------|--------------------|
| 2* Forrestania | 27/07/79 | Kon | ? | ? | Unknown. |
| 3* North Ironcap | 05/11/93 | Kon | RVS | Nil | Not relocated |
| 6 Lake Cronin | 05/11/93 | Kon | VCL | Common | Gravel Pit Healthy |
| 8* South Ironcap | 08/07/79 | Kon | VCL | Frequent | Unknown. |
| 9* Lake Cronin | 22/02/90 | Kon | ? | 100+ | Unknown. |

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

Appears to favour disturbed sites such as gravel pits. May respond favourably to fire.

Susceptibility to *Phytophthora* Dieback

Unknown.

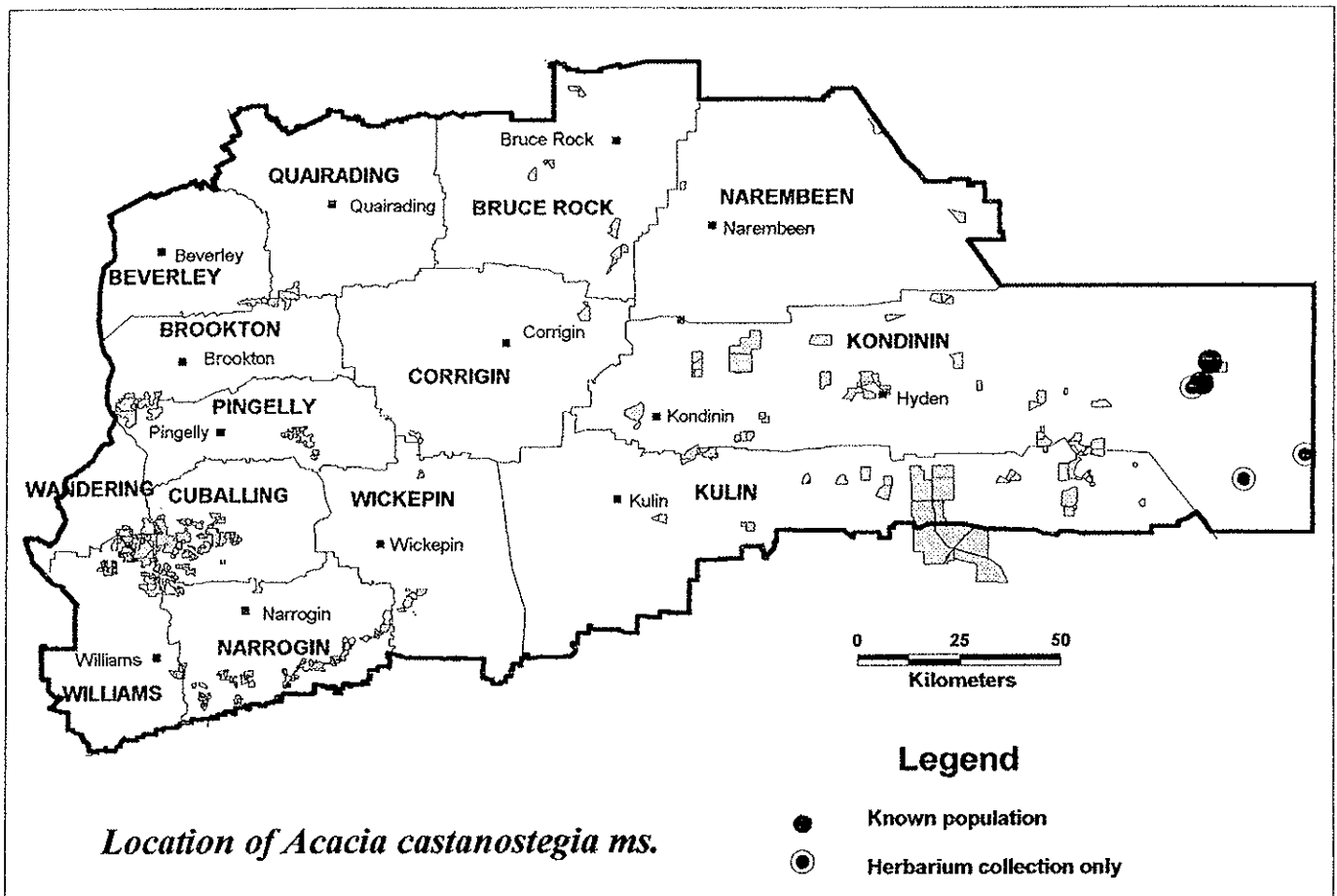
Management Requirements

- Monitor known populations occasionally.

Research Requirements

- Survey within the 1994 burnt area for new populations at Forrestania.

References Maslin (personal communication).



Acacia concolorans Maslin ms.

MIMOSACEAE

A harsh, intricate, sprawling or compact sub-shrub 0.1- 0.4 metres tall and up to two metres in diameter. The stems and branches are green (sometimes tinged purplish). The thickened sessile phyllodes are pungent pointed, 4 - 10mm long and 1.5 - 2mm wide, five nerved, more or less sticky decrease in size toward the end of the branchlets. They are sometimes deciduous at some nodes spreading, same colour as branchlets, the upper margin not nerve-like. The inflorescences are imperfectly developed with 2- headed racemes with axes less than 0.5 mm long. Peduncles are 1.5- 3mm long, glabrous, recurved in the fruit. The golden flower heads are small and globular shaped. The 2 mm long stipules are spiny widely spreading with a thick green base. Legumes are narrowly oblong, 5cm long and 4-5mm wide, curved to coiled, without hair, dark greyish brown containing dark brown seeds with white arils half or more the length of the seed. Related to *A. inamabilis* which is readily distinguished by its glabrous, finely yellow- ribbed branchlets, larger phyllodes, up to 25- flowered heads, petals united on the calyx and long legumes.

Flowering period: July to September.

Distribution and Habitat in the Narrogin District

Known from the Parker Range area (47 kilometres south- south- east of Southern Cross), Marvel Loch and 135 kilometre south east to Karlgarin. Grows in Eucalyptus woodland or myrtaceous heath, often in disturbed areas, growing in slightly red-brown loam at the base of laterite hills, or grey-brown clay on flats, or grey brown loam over granite. It may be found associated with *A. erinaceae* , *A. hemiteles*, *Melaleuca* sp., *Scaevola* sp., *Santalum* sp. and *Exocarpus aphyllus*.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|----------------------|-------------|-------|-------------|---------------|-----------------|
| 1* Karlgarin | 12/08/85 | Kon | RVM? | ? | Maslin |
| 2* West of Karlgarin | 06/10/90 | Kon | RVM | ? | Maslin. Common. |

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

Reported to be regenerating along a disturbed road verge.

Susceptibility to *Phytophthora* Dieback

Unknown.

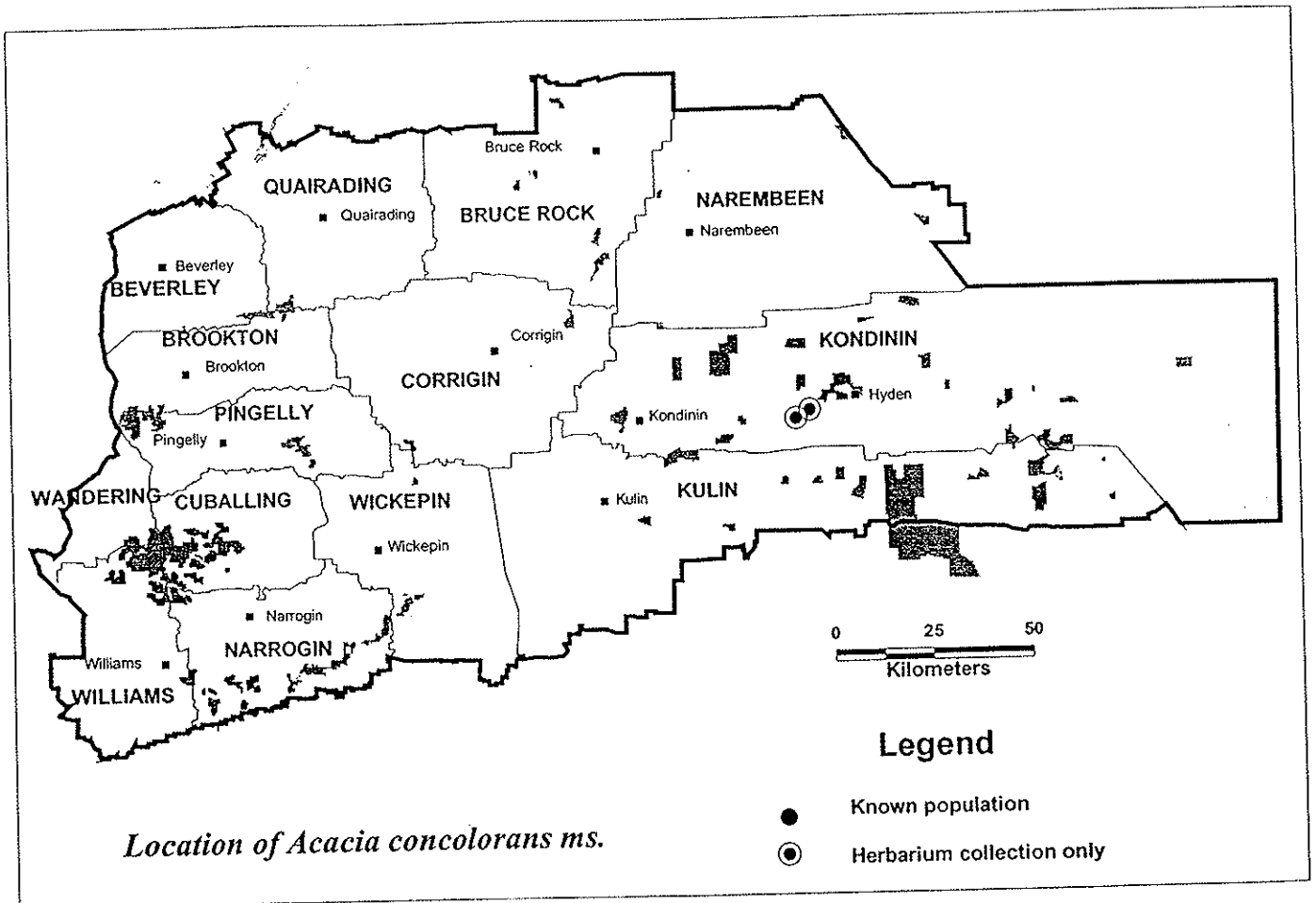
Management Requirements

- Nil until populations relocated.

Research Requirements

- Survey to relocate known populations in the District.
- When relocated survey for new populations on adjacent conservation reserves.

References Maslin (Personal communication).



Acacia cowaniana Maslin

MIMOSACEAE

A. cowaniana is a shrub or small tree to 5 metres and occasionally to 8 metres tall. It is divided at or near ground level to form a few main trunks. The fibrous bark is grey and longitudinally fissured on main trunks near the base. It is smooth and grey-red or reddish brown on the upper branches. Branchlets are cylindrical, angled at extremities, obscurely ribbed, hairless or with sparse upward turning short hairs. The hairs are white or golden and mainly confined to ribs. The phyllodes are sticky from resin, 3-5 cm long and 1-2.5 mm wide, narrowed at base. The 10 mm diameter spherical flowers are cream to very pale lemon yellow, two headed, with 20 flowers per head that are sticky from resin. The seed pods are slightly sticky from resin, 8 mm long and 4.5-6 mm wide, straight to slightly curved, slightly wavy and rounded on opposite sides over alternate seeds.

Named in honour of Richard Cowan recognising his contribution to botanical bibliography and study of Australian *Acacias*.

Flowering period: April - July.

Distribution and Habitat in the Narrogin District

Collections in the Narrogin District have been made from Jilakin Rock. It is also reputed to occur at Nangeen Hill. It is restricted to pockets of skeletal sandy loams. around granite outcrops.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-----------------|-------------|-------|-------------|---------------|----------------------------|
| 4* Jilakin Rock | 02/05/86 | Kul | NR | ? | Unable to relocate. |
| 5 Nangeen Hill | ? | Bru | NR | ? | Unknown. Thought to occur. |

Kul Shire of Kulin

Bru Shire of Bruce Rock

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

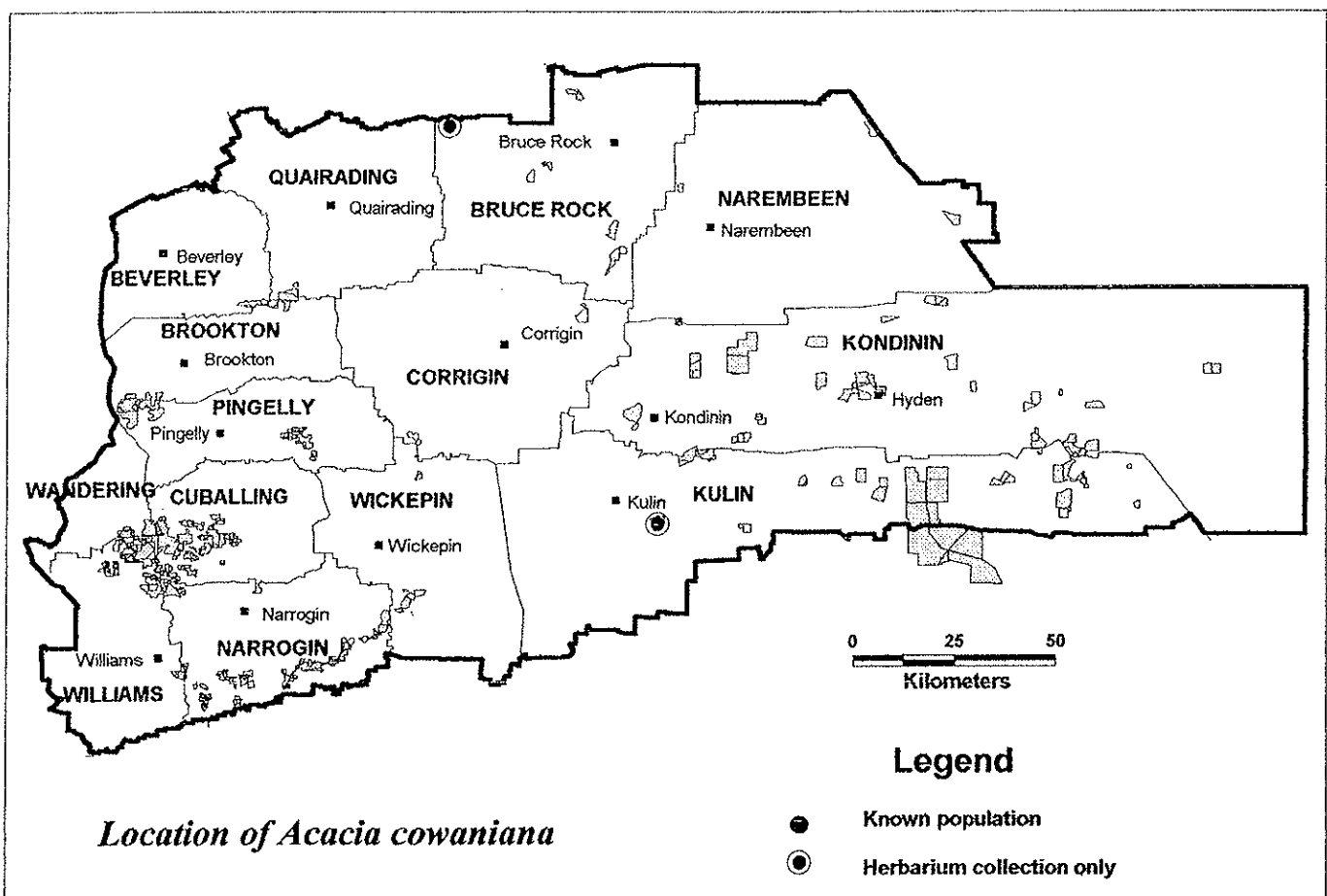
Management Requirements

- Nil.

Research Requirements

- Attempt to relocate population number 4.
- Survey for new populations in the vicinity of granite rocks in the eastern portion of the District.

References Maslin (1990).



Acacia cuneifolia Maslin ms.

MIMOSACEAE

A. cuneifolia is a shrub 1.5-3 metres tall with hairless branchlets. The commonly lop-sided wedge or oblong wedge phyllodes are occasionally bundled and variably shaped, sharp, from 8-25 mm long and 3-6 mm wide, recurved, sometimes wavy, hairless and the midrib off centred. The stipules may be spiny. The racemes range from single to many headed. The peduncles are 5-20 mm long, often with bracts. The 3.5-4.5 mm diameter globular flower heads are a golden colour and consist of 23-26 flowers. The 5 cm long, 4.5-5.5 mm wide hairless legumes are strongly curved to loosely coiled. The dull, dark brown seeds are 4-5 mm long, with a cream fleshy appendage on the end of the seed.

The manuscript name refers to the wedge shaped leaf. It is closely related to *A. congesta* which has free, spoon shaped sepals about half as long as the corolla.

Flowering period: September - October.

Distribution and Habitat in the Narrogin District

Known from three populations from south west of York to Boyagin Rock growing in dark brown clay and coarse sand in run-off channels on and near the base of granite rocks.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|----------------|-------------|-------|-------------|---------------|-----------|
| 1 Boyagin Rock | 06/08/87 | Pin | NR | ? | Unknown. |

Pin Shire of Pingelly

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

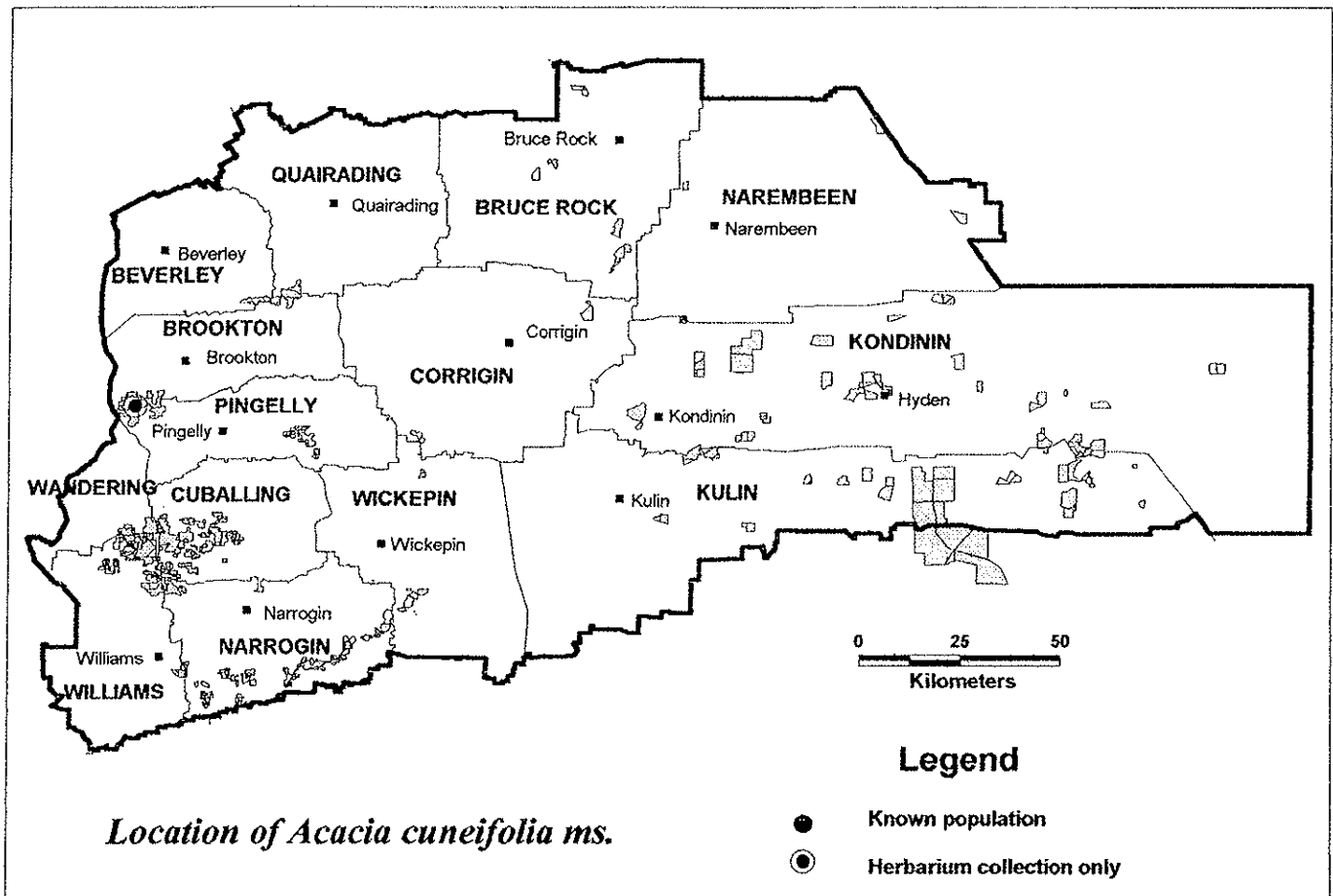
Management Requirements

- Re-locate population number 1 and confirm numbers and condition of population. The population was reported to occur in creek areas adjacent to granite rock.

Research Requirements

- Survey for additional populations on conservation reserves in drainage channels around granite rocks.

References Maslin (personal communication).



Acacia deflexa Maiden et Blakely

MIMOSACEAE

A. deflexa is a low, wide spreading shrub from 150-300 mm high and spreading to a much greater diameter. The branches are cylindrical and slightly tapered with dense long soft hairs to almost hairless when old. The phyllodes are prominently tri-nerved, 10-15 mm long and 4-5 mm wide and bend downwards with cotton like hairs, thick, elliptical, concave, with a sharp spiny tip. The flowers are spherical with 10-12 heads. The peduncles may be single or in pairs, densely hairy, bearing sepals shortly united at base. The petals are thick, broad lance shaped, concave, with a faint central nerve, more than twice the length of the sepals. The ovary is densely covered with close almost microscopic hairs that give a whitish or greyish hue. The seed pods compress around the seeds.

A. deflexa looks much like *A. gemina* but has generally smaller, more deflexed and hairy leaves, more blue-green than yellow-green coloured phyllodes, and phyllodes not so flattened.

The species is named from the Latin word *deflexus* in relation to the phyllodes being bent, turned downwards or aside.

Flowering period: July - August.

Distribution and Habitat in the Narrogin District

A. deflexa is only known from the Narrogin District growing in sand, sandy loam and laterite soils, associated with open wandoo woodlands, and *Hakea* with *Allocasuarina campestris* heath.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|----------------|-------------|-------|-------------|---------------|-----------|
| 1* Toolibin | 09/10/77 | Wic | ? | ? | Unknown. |
| 2 Bendering | 07/10/93 | Kon | NR | 35 | Healthy |
| 3* Corrigin NE | 21/07/84 | Cor | ? | ? | Unknown. |
| 4* Wickepin | 1973 | Wic | RVS | ? | Unknown. |
| 5* Bendering | 18/10/61 | Kon | NR | ? | Unknown. |
| 6* Corrigin NE | 11/08/85 | Cor | PP | ? | Unknown. |
| 7* Dryandra | 09/07/87 | Wil | SF | ? | Unknown. |
| 8 Commodine | 20/04/93 | Cub | NR | ? | Unknown. |
| 9* Boyagin | 08/10/64 | Pin | NR | ? | Unknown. |
| 10* Billercay | 04/08/70 | Kon | ? | ? | Unknown. |
| 11* Narrogin | 3/1938 | Nar | ? | ? | Unknown. |
| 12 Wedin | 08/12/93 | Wic | RWR | Common | Healthy |
| 13 Harrismith | 02/11/93 | Wic | RVS | 1 | Healthy |
| 14 Sedgewick's | 05/10/94 | Kon | PP | 1 | Healthy |

Wic Shire of Wickepin
Kon Shire of Kondinin
Cor Shire of Corrigin
Wil Shire of Williams

- Cub Shire of Cuballing
- Pin Shire of Pingelly
- Nar Shire of Narrogin
- * population known only as Herbarium record

Response to Disturbance

May respond to disturbance. This may account for its occurrence along firebreaks, tracks and in railway reserves.

Susceptibility to *Phytophthora* Dieback

Unknown.

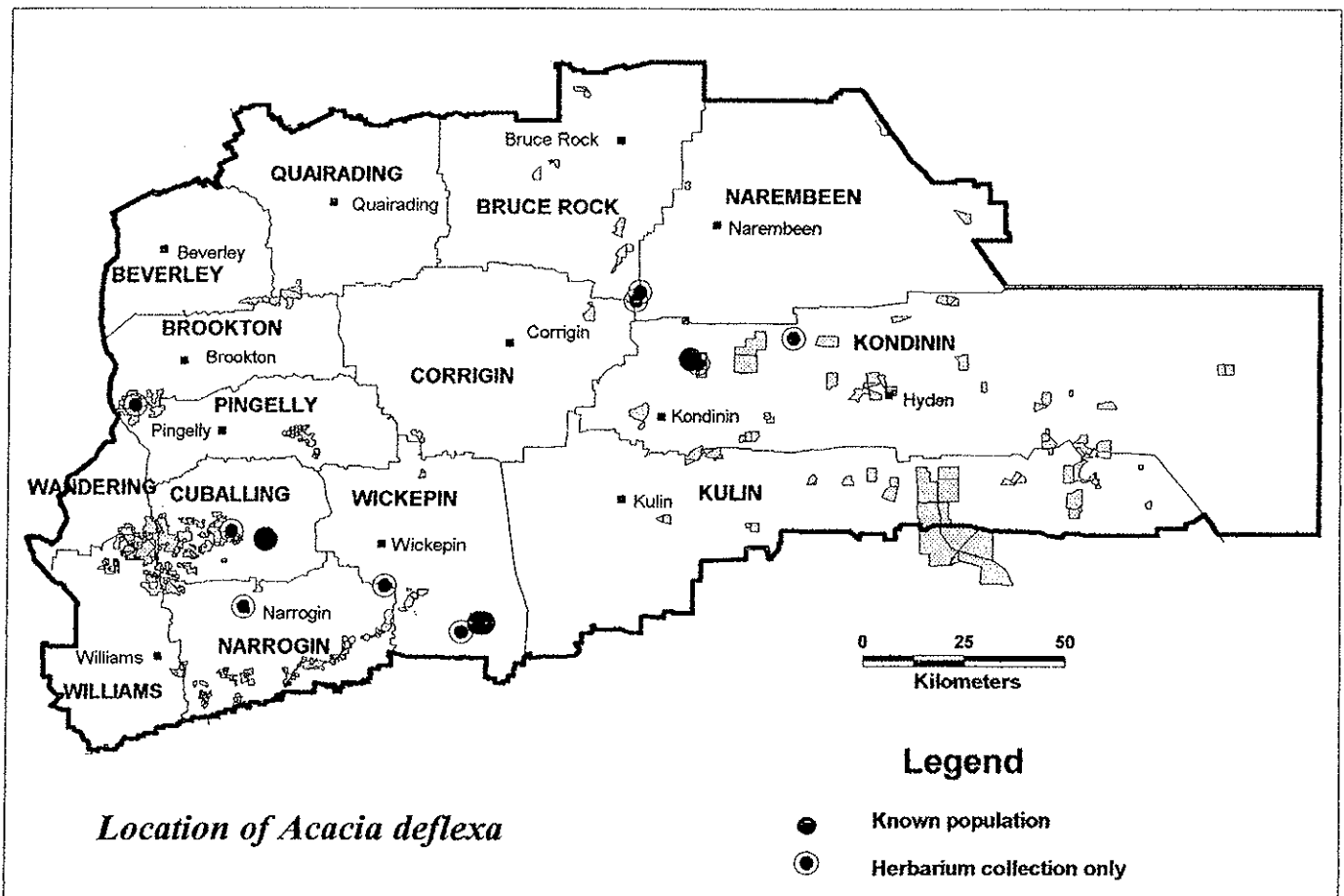
Management Requirements

- Monitor known populations occasionally.

Research Requirements

- Confirm identity of population number 2.
- Attempt to relocate population number 7.

References Maiden et Blakely (1828), Cowan (personal. communication).



Acacia heterochroa subsp. *robertii* Maslin

MIMOSACEAE

A spreading to erect multi-stemmed shrub to 2 metres tall with cylindrical ribbed branchlets that normally have a waxy, powdery bloom. The new shoots, the young inflorescence stalk and the buds are reddish. The 1-2.5 cm long and 1-1.5 cm wide off centred triangle shaped phyllodes are grey-green, with the margin towards the axis conspicuously rounded and the phyllode end point being sharply pungent. The 0.5-1 cm long peduncles are in 2-8 headed racemes that are 1-3.5 cm long. The flower heads are 5-6 yellow flowered.

Flowering period: July - September.

Distribution and Habitat in the Narrogin District

Known from an area east of Dragon Rocks Nature Reserve to Holt Rock and eastwards to Digger Rock, growing on laterite gravel in woodland and heath vegetation. May be found with *Hakea crassifolia*, *Grevillea* aff. *baxteri*, *Verticordia serrata*, *Dryandra* sp., *Melaleuca* sp., and *Chamelaucium megalopetalum*.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|------------------|-------------|-------|-------------|---------------|-----------|
| 1 Holland Track | 01/09/94 | Kul | TBR | Abundant | Healthy |
| 2* Digger Rock | 24/07/79 | Kon | ? | ? | Unknown. |
| 3* Holt Rock | 02/07/72 | Kul | ? | ? | Unknown. |
| 4 Carstairs Road | 04/11/93 | Kon | RVS | Scattered | Healthy |
| 5 South Ironcap | 15/09/93 | Kon | VCL | 25+ | Healthy |
| 6 Digger Rock | 10/12/93 | Kon | TRS. | 2 | Healthy |
| 7 Russo Road | 01/09/94 | Kul | TBR | Abundant | Healthy |

Kul Shire of Kulin

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

Appears to respond favourably to disturbances such as fire, clearing and road grading.

Susceptibility to *Phytophthora* Dieback

Unknown.

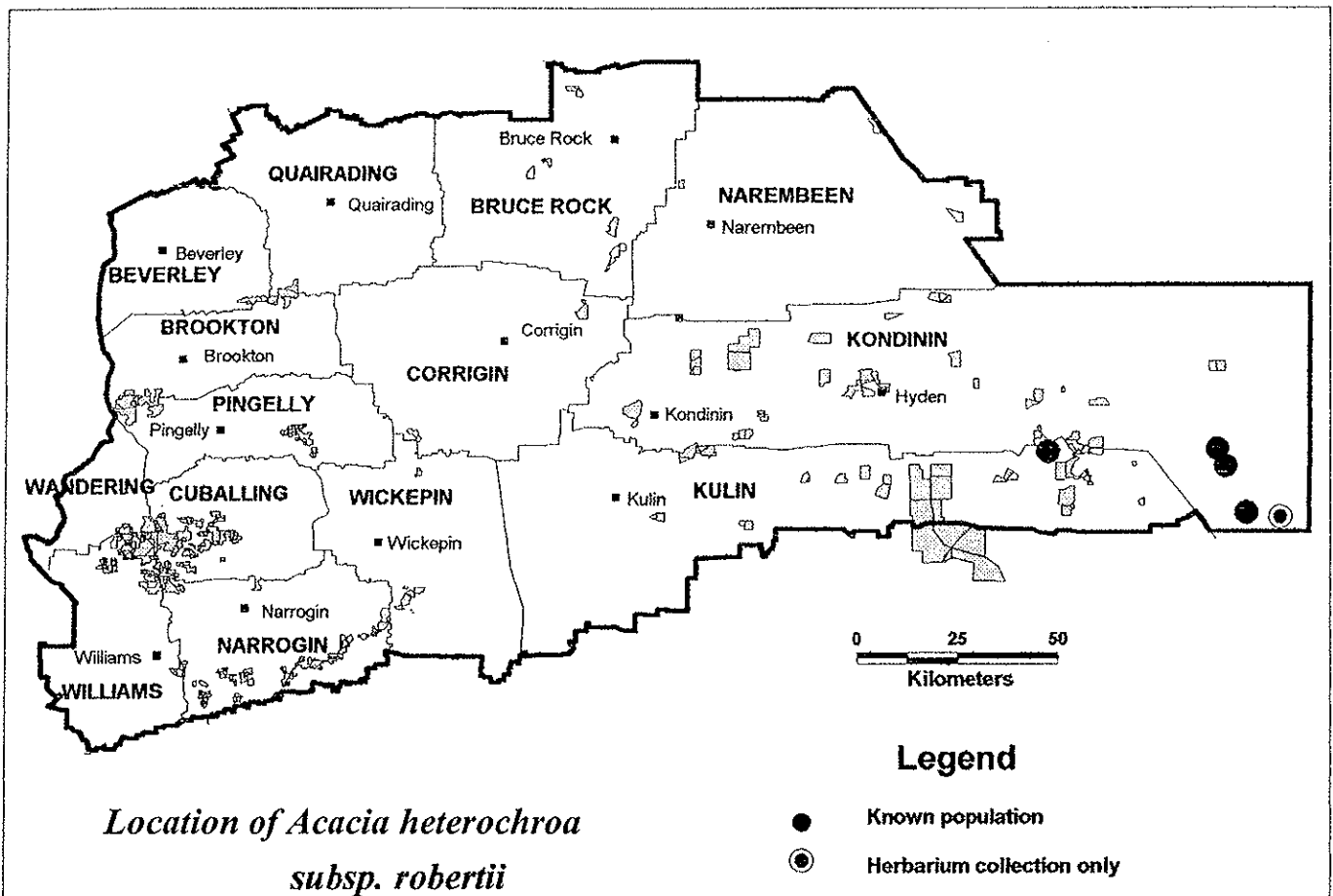
Management Requirements

- Monitor populations occasionally.

Research Requirements

- Survey opportunistically for new populations. May be more wide spread than thought. Survey along grid lines and cleared or burnt areas in laterite in Vacant Crown land and conservation reserves east of Hyden.
- Research disturbance response.
- Review protection status.

References Maslin, B.R. (personal communication).



Acacia insolita subsp. *recurva* (Pritzell) Maslin

MIMOSACEAE

A shrub 0.6-1.2 metre tall with bipinnate leaves that are persistent on mature plants. The flat to compressed, thick phyllodes are 1-3 cm long and 1-1.5 mm wide with the midrib not prominent. The central leaflet stalk is 2-4 cm long. The pinnules are in 7-10 pairs, shallowly concave shaped but often folded longitudinally about midrib when dry, recurved, sometimes hairless. The flower heads seemingly golden. The legumes 5-6 mm wide. Seeds are square to oblong shaped. An unusual feature of this plant is the retention of its juvenile bipinnate foliage. The subspecies name refers to the recurved pinnules.

Flowering Period: July - August.

Distribution and Habitat in the Narrogin District

Known only from one location north east of Narrogin on an exposed laterite ridge in Eucalyptus woodland with *Dryandra nobilis*.

Conservation Status

Current: Priority 2[#]

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|---------------------|-------------|-------|-------------|---------------|-------------|
| 1 East of Yornaning | 12/09/88 | Cub | NR | ? | Undisturbed |

Cub Shire of Cuballing

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

Management Requirements

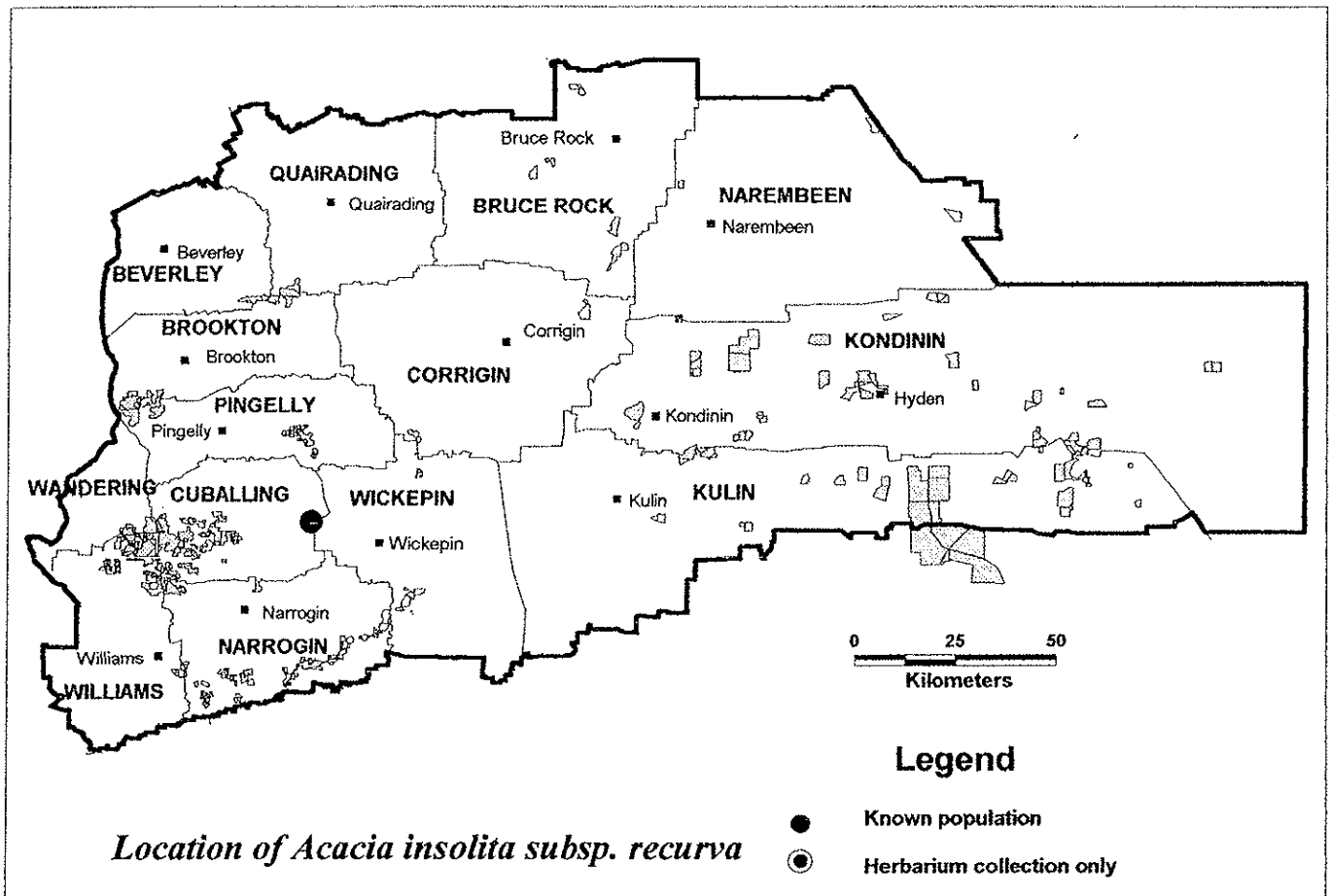
- Monitor known population annually.

Research Requirements

- Survey for new populations especially in areas containing laterite ridges. Concentrate surveys in the Dryandra State Forest and nearby conservation reserves.

[#] now Declared Rare Flora (updated at December 1999)

References Maslin (1975), Pritzel (1904).



Acacia kerryana Maslin

MIMOSACEAE

A. kerryana is a dense, low spreading shrub, 0.5-1 metres tall with the slightly ribbed, often sparsely hairy branchlets bend in a zigzag formation towards the ends. The 8-16 cm long, 0.4-0.6 mm wide phyllodes are stalkless and continue down the stem. They are cylindrical in shape, hairless, often strongly curved, crooked, with ends tapered, with 8 widely spaced more or less equal raised nerves. The gland is inconspicuous, about 4 cm above the phyllode base. There are 2 or 3 light golden main flower stalks per axil. The flowers are in 4 parts. The sepals are united. The 8.5 cm long, 2 mm wide legumes are linear, twisted, with a papery texture.

Flowering period: October - February

Distribution and Habitat in the Narrogin District

Known from five populations in four localities including Lake Cronin, Bremer Range, Norseman and near Kambalda, growing in shallow loam on low rocky hills in low open shrubland.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|----------------|-------------|-------|-------------|---------------|-----------|
| 4* Lake Cronin | 07/10/81 | Kon | VCL | Rare | Unknown. |

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

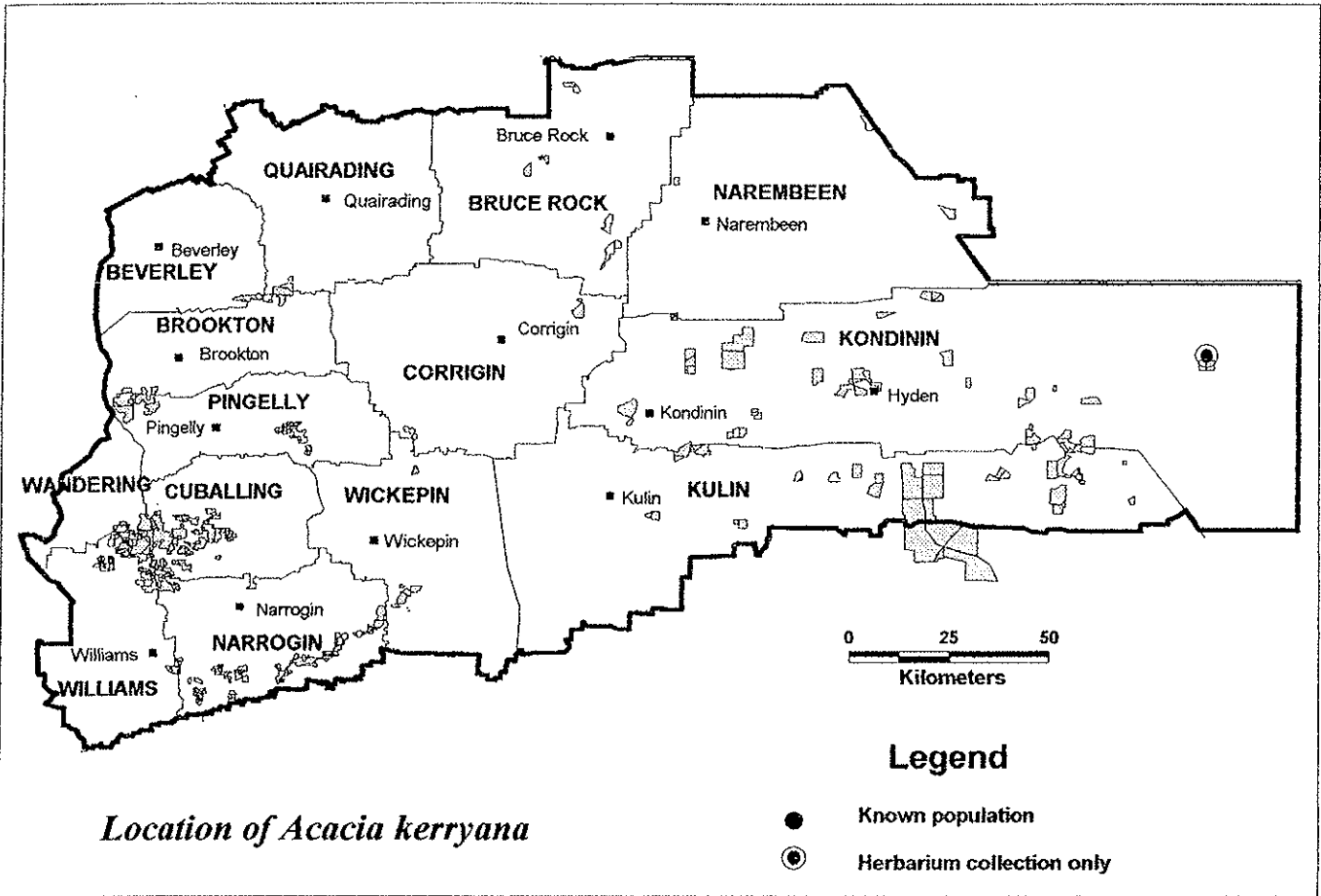
Management Requirements

- Relocate population number four and confirm numbers and condition of population.

Research Requirements

- Survey for additional populations on rocky granitic rises in the Forrestania area.

References Maslin (1982).



Acacia tetraptera Maslin ms.

MIMOSACEAE

A spreading, semi-open, 0.2-0.7 metre tall shrub with slender branches and branchlets covered with short hairs. The egg-shaped, 2.5-4 mm long and 2.2-4 mm wide phyllodes spread out widely from the stem. They have a broad end toward the stem, are not symmetric, ending in a stiff sharp point, hairless, 5-nerved, with the midrib strongly raised in a prominent ridge on each face. The peduncles are 2 per node, 4-8 mm long and hairless. The flower heads are ball like, bright light to mid-golden, 4-5 mm diameter with 20-30 flowers. Flowers in 5-parts. Sepals free. Legumes not quite cylindrical, bowed to sub-coiled, 2 cm long, and about 2 mm wide, hairless and black. Seeds are longitudinal, about 2 mm long, mottled grey and black and yellow.

Flowering period: August - September.

Distribution and Habitat in the Narrogin District

A widely distributed species known from Lake Johnson, Mount Holland, the Pimples Nature Reserve, east of Lake King, and also within about 90 kilometre radius of Salmon Gums. It may be found in loam or sand over clayey loam in mallee and open scrub.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-------------------|-------------|-------|-------------|---------------|-----------|
| 3 The Pimple | 01/09/94 | Kul | NR | 1000+ | Healthy |
| 13* Mount Holland | 05/02/87 | Kon | ? | ? | Unknown. |

Kul Shire of Kulin

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

Unknown. However, it is recorded in an area of regrowth and in recently burnt heath.

Susceptibility to *Phytophthora* Dieback

Unknown.

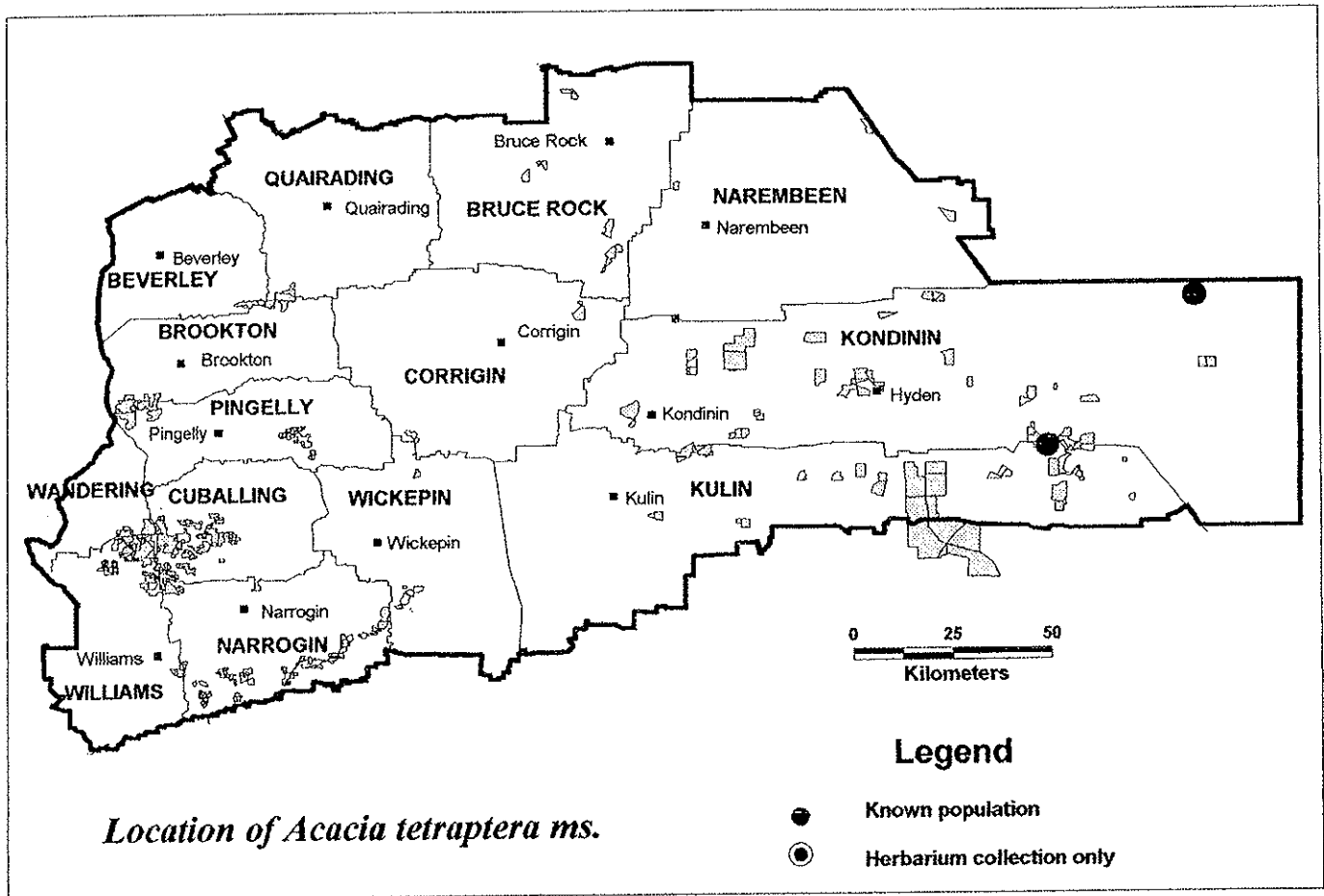
Management Requirements

- Monitor known population occasionally. Ensure population is protected during reserve management operations.

Research Requirements

- Survey opportunistically, in the eastern portion of the District.

References Maslin (personal communication).



Acacia tuberculata Maslin ms.

MIMOSACEAE

Acacia tuberculata ms. is a diffuse shrub from 0.5-2 metres tall, the phyllodes and peduncles having small, brown to black dots. The dark green narrow phyllodes are about 1-3 cm long and 2-5 mm wide, are more or less stalkless, flat or wavy, with the margins and midribs covered with wart-like bumps. There is one strongly raised nerve on each phyllode face. The young branchlets are weakly hairy. The stipule bases are hardened and persist as blunt tooth-like projections. The 2-5 headed flower heads are 4-7 cm long and are 30-60 flowered. The mid-golden spherical flowers are 5.5-7 mm long and 4-5.5 mm in diameter and consist of 5 parts. Sepals are mostly free. The phyllodes on plants near Hyden have flat or only slightly undulating margins. Those near Mount Vernon have strongly undulating margins. The name refers to a covering of small, wart-like swellings.

Flowering period: August - October.

Distribution and Habitat in the Narrogin District

Occurs from Mongers Lake, near Hyden, Camel Peaks, the Hump, and southwards to Mount Vernon. In the Narrogin District it may be found in association with sheet granite and granite outcrops and appears to favour disturbed sites.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|----------------|-------------|----------|-------------|---------------|---------------|
| 1 Hyden | 01/09/94 | Kondinin | RVM | 1 | Poor |
| 2* The Hump | 08/10/93 | Kondinin | NR ? | Nil | Not relocated |
| 3* Camel Peaks | 01/09/94 | Kondinin | RVS | Nil | Not relocated |
| 4 Hyden | 01/09/94 | Kondinin | RVM | 1 | Poor |

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

Responds favourably to fire. Populations 1 and 4 are located on disturbed areas.

Susceptibility to *Phytophthora* Dieback

Unknown.

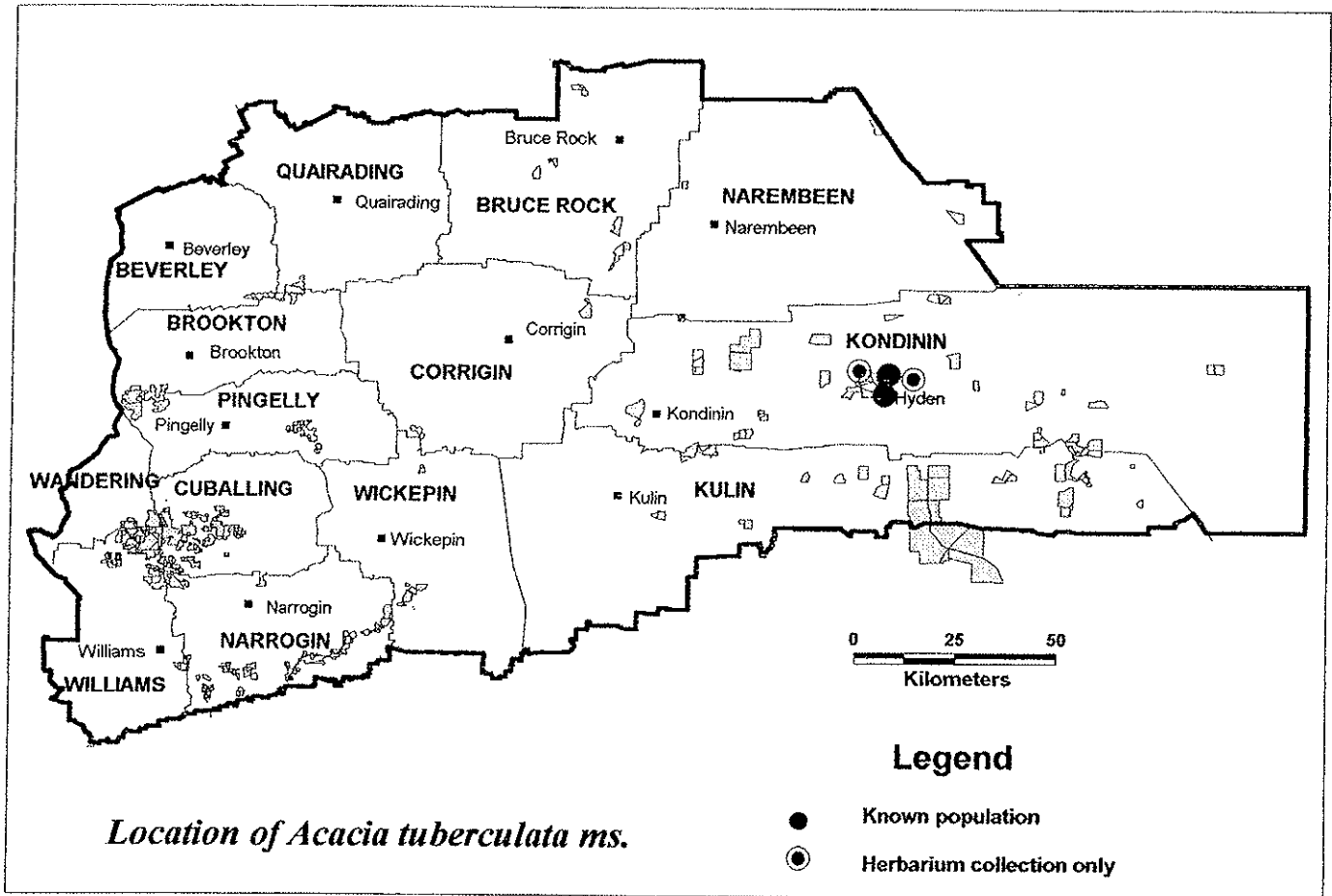
Management Requirements

- Ensure population 1 and 4 are adequately protected from roadside management operations.

Research Requirements

- Survey for new populations on sheet granite or granite outcrops, in the Hyden area, especially on recently burnt conservation reserves.

References Maslin (personal communication).



Acacia undosa Cowan & Maslin ms.

MIMOSACEAE

A shrub 0.5-1.5 metres tall, the branchlets covered in black micro-hairlets. The 2-4.5 cm long, 2-4 mm wide phyllodes are linear to lance shaped, the narrow end near the leaf attachment, has a sharp spiny tip. The phyllode is rigid, hairless apart from a dense covering near the swollen leaf base with 9 close nerves, occasional veins and raised stomata. There are 2 glands. The 2 mm long stipules persist. The 1-1.5 mm long, 2 per axil peduncles are hairless. The 8-20 golden flowered flower heads are spherical. The 3-3.5 mm diameter flowers contain 5 parts. The 4 cm long, 2.5 mm wide linear legume is strongly wavy, a much paler marginal distinct nerve. The seed is 2.2-2.7 mm long, dark-brown with fleshy appendage.

Flowering period: August - September.

Distribution and Habitat in the Narrogin District

A widely distributed plant recorded from Cunderdin, north of Merredin, Mount Holland, east of Lake King and to Lake Grace. It may be found growing on clayey sand or loam soils, alluvium, in open shrub mallee or open woodland with *Eucalyptus transcontinentalis* and *E. salmonophloia*. It can also inhabit low lying moist areas.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|--------------------|-------------|-------|-------------|---------------|---------------|
| 1 Belka Siding | 31/08/94 | Bru | RWR | 7 | Healthy |
| 3* Pingaring North | 03/11/93 | Kul | ? | Nil | Not relocated |

Bru Shire of Bruce Rock

Kul Shire of Kulin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

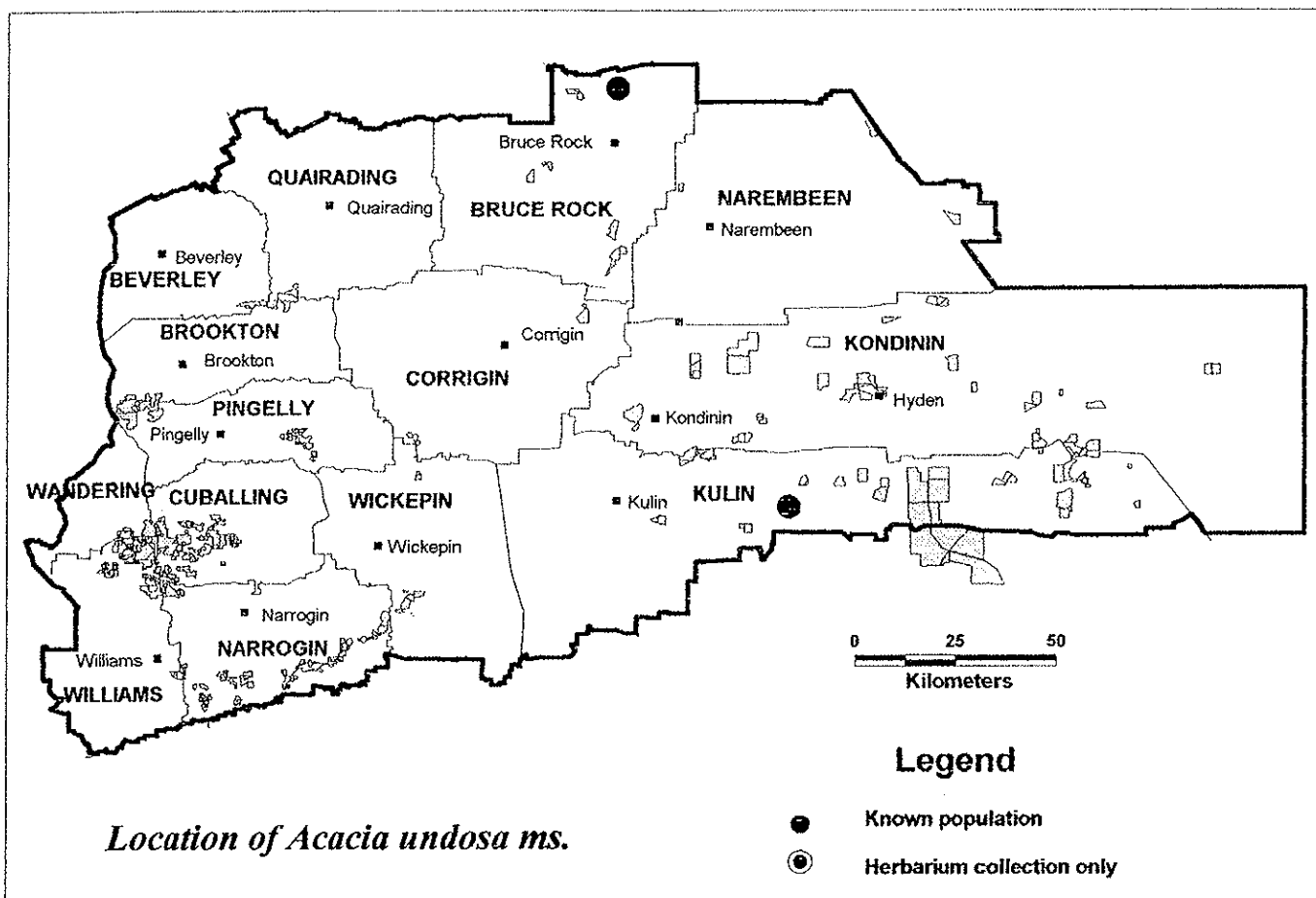
Management Requirements

- Notify Westrail concerning population number 1 to ensure the population is protected.

Research Requirements

- Undertake surveys on conservation reserves within its known distribution.

References Cowan & Maslin (personal communication).



Acrotriche patula R. Br.

EPACRIDACEAE

A. patula is a very rigid, widely spreading stout shrub, 0.4 to 0.6 metre high. The young branches slightly covered with short hairs. The leaves are 6-12 mm long and 2.3-5 mm broad ovate-lanceolate roughly egg shaped, are very rigid, and taper into rigid points. They are more or less concave and sometimes almost heart-shaped at the base. The leaf margins are slightly toothed towards the tip. The almost stemless flowers are pale green in very short spikes or clusters with 6-9 flowers. The flower bracts are small. The 2-3 mm diameter fruit is green, hairless, crinkled and spherical.

Flowering period: September

Distribution and Habitat in the Narrogin District

A widely distributed species, occurring in Western and South Australia. In Western Australia populations are known from Marvel Loch to Cheritons region, near Hatter Hill and the Eucla region. In South Australia it is known from the Eyre Peninsula, in the Mount Lofty Ranges and on Kangaroo Island. *A. patula* occurs in several habitats. In the Marvel Loch - Ironcaps area it may however, favour eroded breakaways of kaolinised granite. Near Hatter Hill it is found growing in mallee of *Eucalyptus* aff. *gardneri*.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|-----------------|-------------|-------|-------------|---------------|--|
| 10* Lake Cronin | 03/10/79 | Kon | ? | ? | Newbey. Not relocated by Buehrig 1993. |

Kon Shire of Kondinin
* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

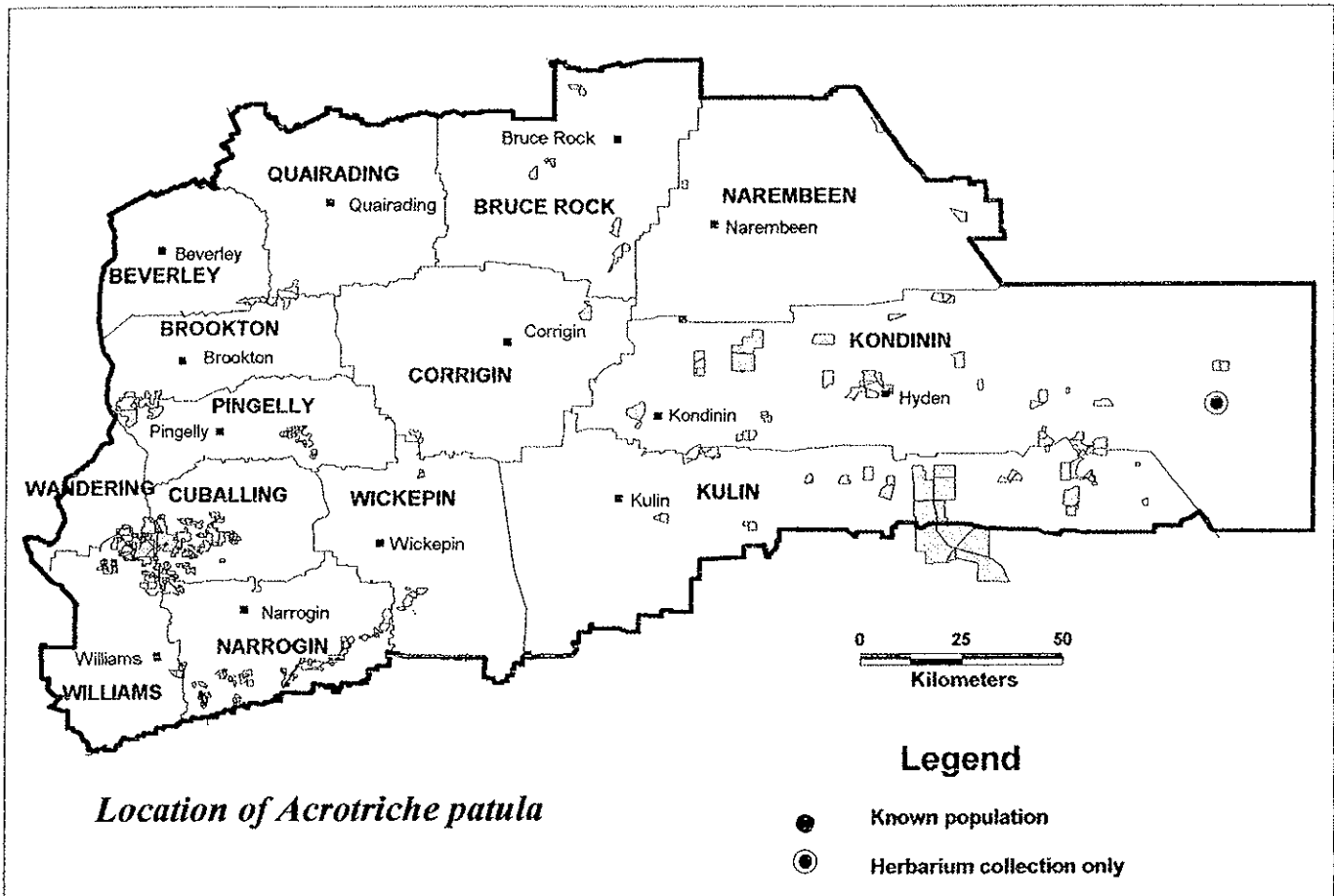
Management Requirements

– Nil until population relocated.

Research Requirements

- The Lake Cronin population appears to have been collected south west of Lake Cronin. The collection records is obscure However, surveys should concentrate on "kaolinised" breakaways in the Forrestania area.

References Brown. (1810), Blackall and Grieve (1981).



Amanita carneiphylla Miller

AMANITACEAE

A. carneiphylla is a fungus with a medium to large fruiting body. The 5-7.5 cm diameter cap is broadly convex and dry dull white with low soft, white warts over the centre becoming less frequent or absent over the margin. The cap is often covered with sand. The gills are very light pink at first, gradually becoming pink. The dull white stalk is 13.5-15 cm long, 1.5-2 cm wide at midpoint, and the base is broader, 2.5-3.5 cm. The flesh is firm, white tinted pink, especially in age. There is no distinct odour. This fungus' distinct characters include pink gills and flesh, white warts on the cap, with a long rooting base. No other species has these combination of characteristics.

Flowering period: Fruiting May to early June.

Distribution and Habitat in the Narrogin District

A. carneiphylla occurs on the grounds of Murdoch University Campus and at Dryandra State Forest. On the University Campus, this fungus is usually buried almost to the cap in sandy soil under an open stand of *Eucalyptus marginata*, *Banksia menziesii* and *Allocasuarina fraseriana*.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|------------|-------------|-------|-------------|---------------|-----------|
| 2 Dryandra | 06/1992 | Wil | SF | ? | Unknown. |

Wil Shire of Williams.

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

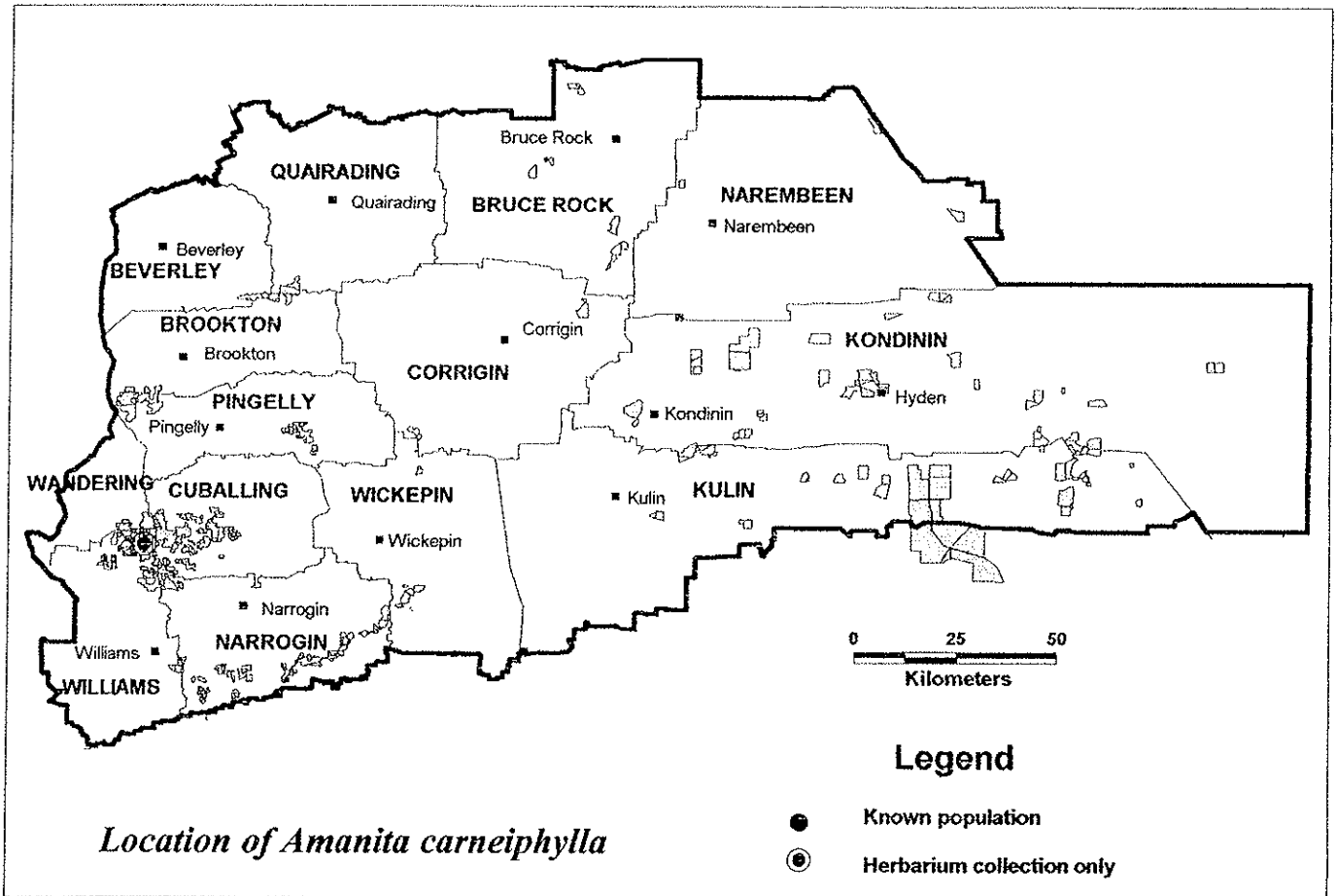
Management Requirements

- Until relocated, protect the population site from forest management operations.

Research Requirements

- Survey to relocate population number 2. Investigate further information concerning the site of population number 2. In Dryandra, the fungus may occur on colluvial sand associated with older drainage courses.

References Miller (1991).



Andersonia bifida Watson

EPACRIDACEAE

A. bifida is a low shrub to about 30 cm high with short-linear leaves 2-4 mm long, 0.5-1 mm wide at the base. The light yellow flowers are in clusters of 2-6. The bracts are similar to the leaves, but more egg-shaped with a broader end towards the stem. The bracteoles are somewhat shorter than the bracts. The sepals are 3-5 mm long. The corolla is 2.5-4.5 mm long. The fork in the anther is at least as long as filaments.

The species name refers to the anther which is noticeably forked or divided into two parts.

Flowering period: September.

Distribution and Habitat in the Narrogin District

Known from the Dryandra State Forest, west of Highbury and also collected in 1910 from an obscure location somewhere between Bridgetown and Slab Hut Gully. It appears to inhabit grey sandy loams, derived from granite. It may occur on heath vegetation with *Allocasuarina microstachya*, *A. humilis*, *Petrophile* sp., *Baeckea* sp. and *Calothamnus quadrifidus*.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-----------------|-------------|-------|-------------|---------------|-----------|
| 1 Dryandra | 08/10/92 | Cub | SF | Common | Healthy |
| 2 W of Highbury | 04/10/94 | Nar | TBR | Common | Healthy |

Cub Shire of Cuballing

Nar Shire of Narrogin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

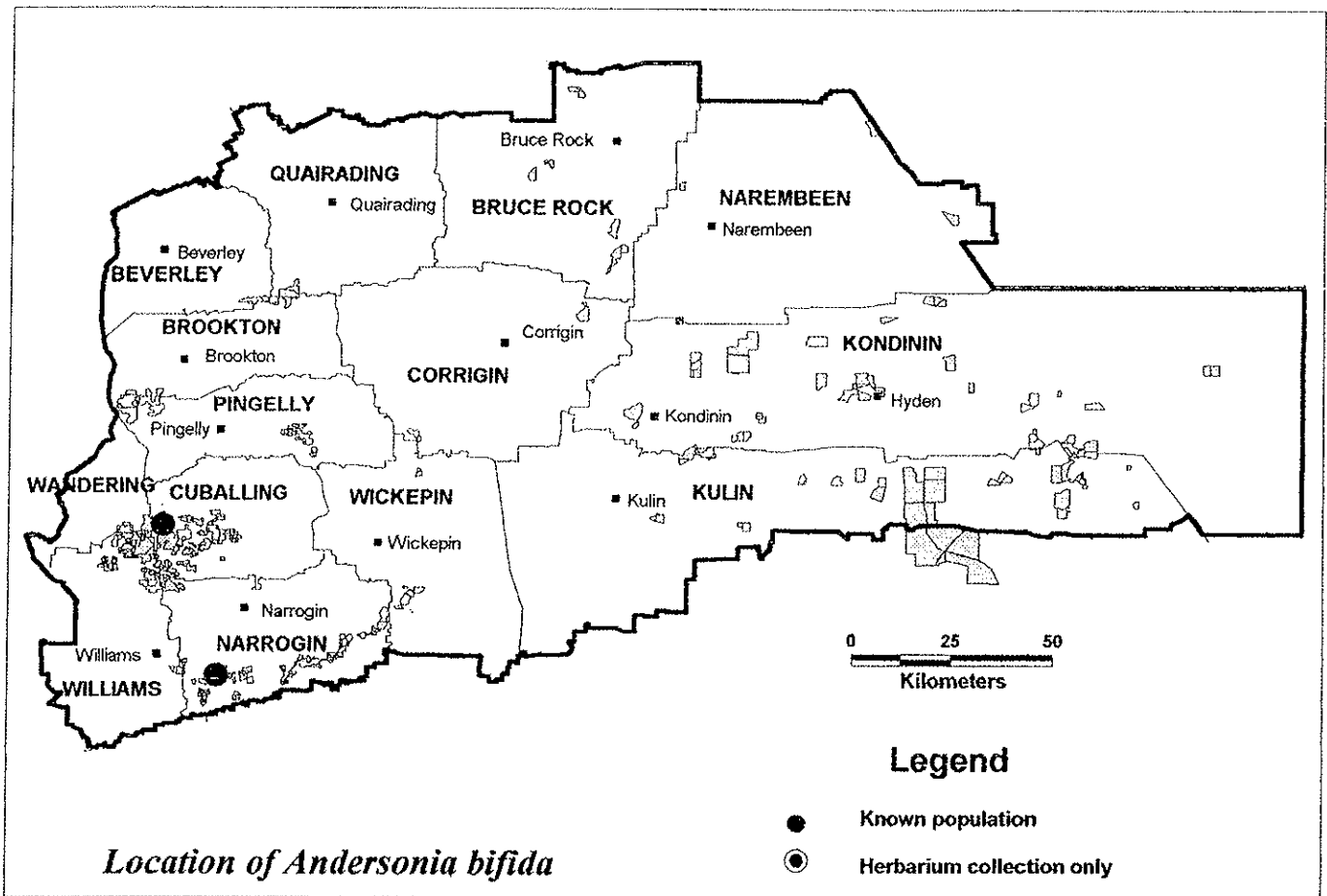
Management Requirements

– Monitor known populations occasionally.

Research Requirements

- Survey for new populations on conservation reserves within the species known distribution.

References Watson (1962). Blackall & Grieve (1981).



Andersonia carinata Watson

EPACRIDACEAE

A. carinata is a low and spreading shrub, 20-30 cm tall. The 2-5mm long and 1.5-2mm wide ovate leaves are pressed closely against the stem at the base. There are 6-12 pink flowers arranged in terminal bundles, fringed with cilia at the margins of the sepals and covered with short, soft hairs below the middle of the inner part of the petals.

A. carinata is similar to *A. parviflora*, but is distinguished by its keeled small bracts immediately below the calyx of the flower and petals that are covered with short, soft downy hairs inside.

The species is named from the Latin word *carinatus*, meaning boat-shaped or keeled, ie. with a raised central rib underneath. It refers to the keeled small bracts immediately below the calyx of the flower.

Flowering period: August - November.

Distribution and Habitat in the Narrogin District

A. carinata is widely distributed in the south west corner of Western Australia with most collections from between Harrismith and Wagin. In the Narrogin District it has been collected from north east of Traysurin (near Harrismith) and in the Dongolocking area.

It favours colluvium and alluvial soils and grows in mixed tall shrubland on gentle undulating plain that may be seasonally wet.

Conservation status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|--------------|-------------|-------|-------------|---------------|---------------------------------|
| 3* Wickepin | 25/08/85 | Wic | NR | ? | Unknown. |
| 9* Traysurin | ? | Kul | ? | ? | Unknown. Not relocated in 1994. |

Wic Shire of Wickepin

Kul Shire of Kulin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

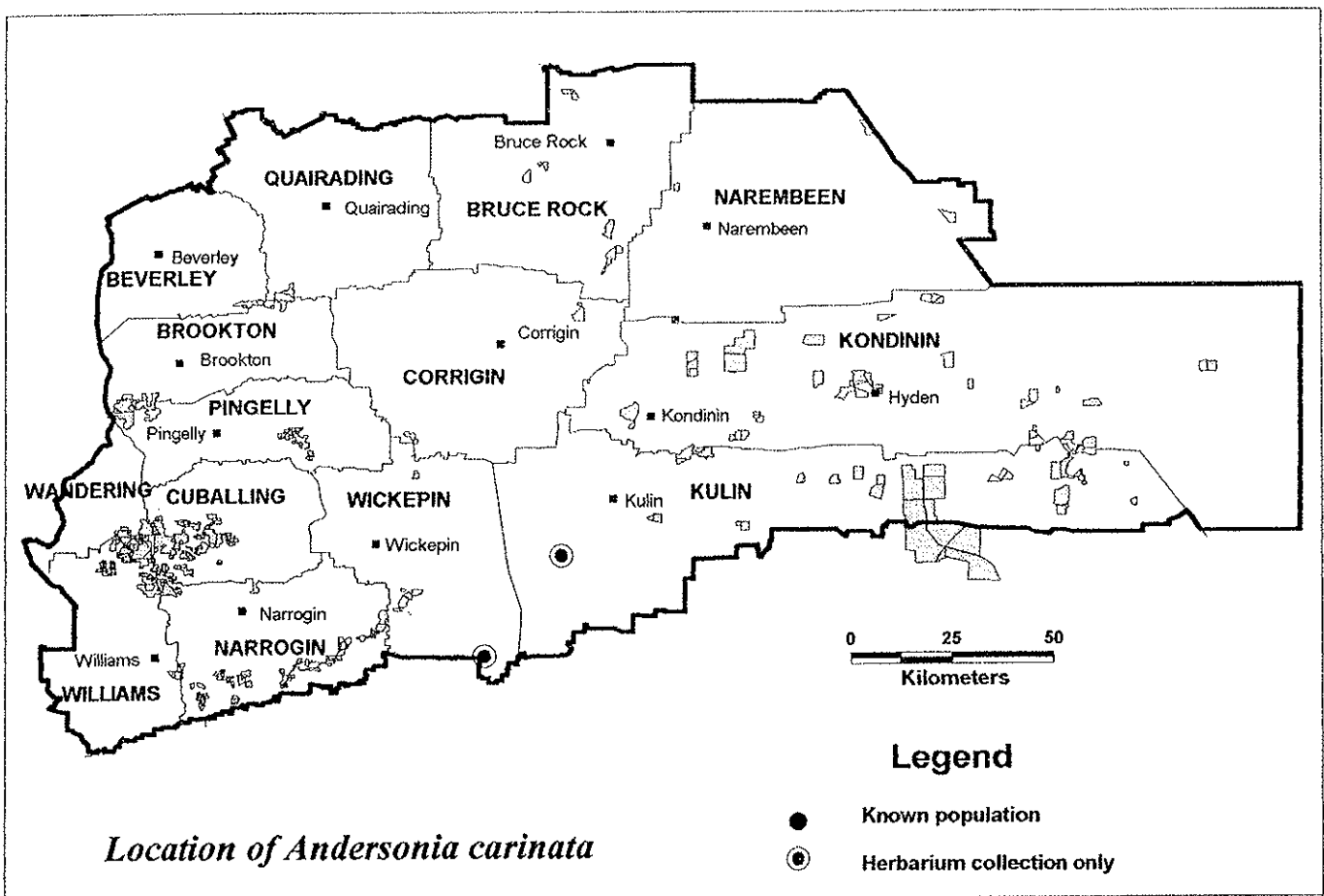
Management Requirements

- Population number 9 is invaded by agricultural weeds and may need corrective action.
- Monitor known populations occasionally.

Research Requirements

- Re-locate population number 9.
- Survey within conservation reserves in the Dongolocking area on alluvial and colluvium soil types.

References Watson (1962), Blackall and Grieve (1981).



Anigozanthos bicolor subsp. *extans* Hopper

HAEMODORACEAE

A kangaroo paw with leaves 5-15 cm long. Several leafless flower stalks 10-25 cm tall arise from basal leaves. The perianth is red and green in colour with sides parallel or slightly constricted, its size is 4-10 mm wide at narrowest point above the middle and 55-75 mm long. The outer filaments are 2.5-5.5 mm long. The ovary has red hairs.

Flowering period: October - November.

Distribution and Habitat in the Narrogin District

A. bicolor subsp. *extans* grows in low woodlands of *Eucalyptus wandoo*, *Allocasuarina huegeliana* and *Acacia acuminata* in sandy clay-loam apparently near drainage lines from Brookton to Popanyinning and near Meckering.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|----------------|-------------|-------|-------------|---------------|-----------------------|
| 1 Popanyinning | 04/11/92 | Pin | RVM - RWR | Nil | Weeds |
| 5 Pingelly | 05/11/92 | Pin | RVM - RWR | 2 | Weed invasion |
| 6 Pingelly | 05/11/92 | Pin | RVM - RWR | Nil | |
| 7 Pingelly | 11/11/92 | Pin | Rifle Range | 100 | Highly disturbed area |
| 8 Noombling | 05/11/92 | Pin | NR | Common | Weeds |
| 9 Brookton | 02/10/91 | Bro | CAM | Approx. 200 | Disturbed |
| 10 Pingelly | 05/11/92 | Pin | RVM | 12 | |

Pin Shire of Pingelly

Bro Shire of Brookton

* population known only as Herbarium record

Response to Disturbance

May benefit from disturbance. It appears to favour open sites however, it may not compete well with introduced weeds.

Susceptibility to *Phytophthora* Dieback

Unknown.

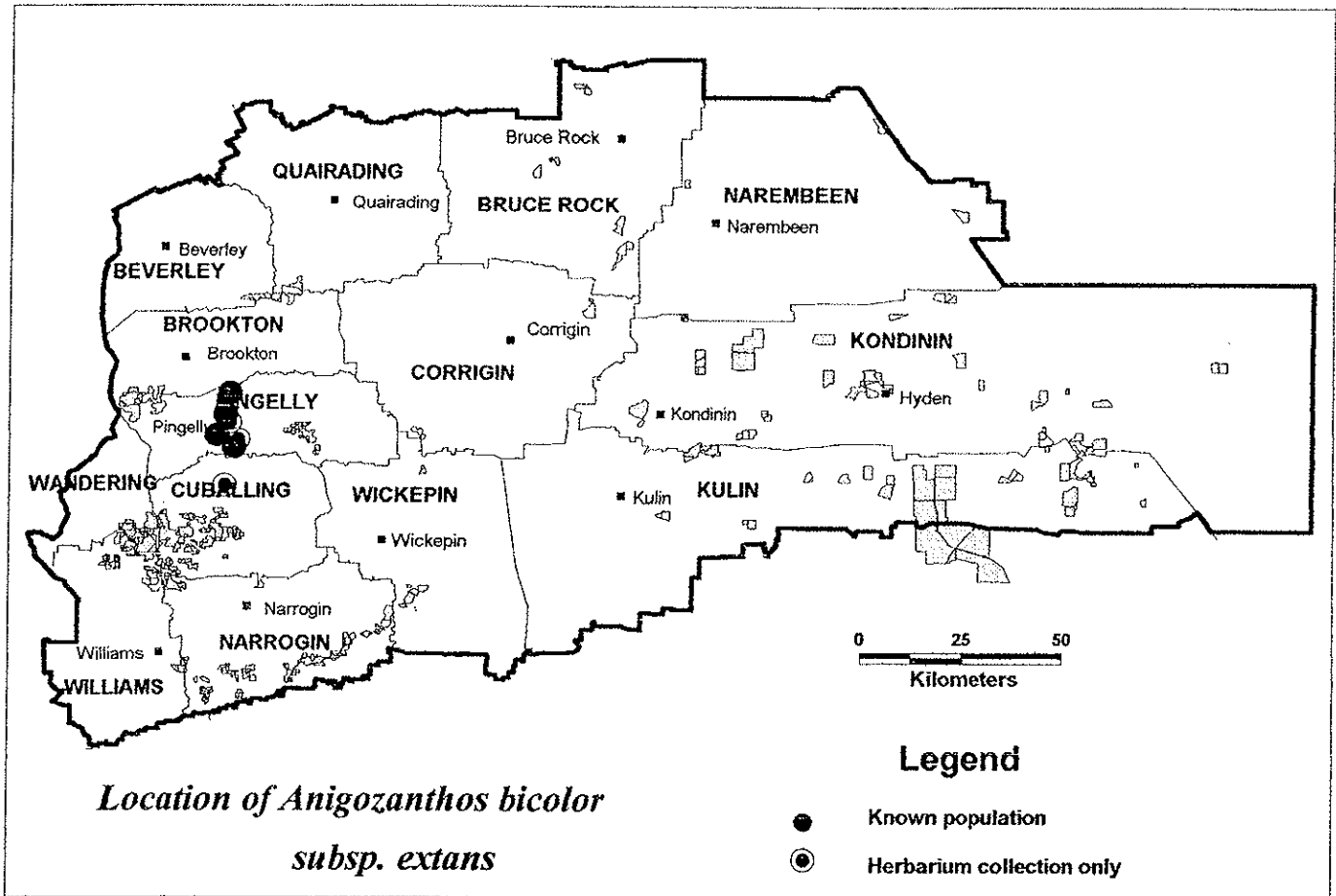
Management Requirements

– Monitor known populations occasionally.

Research Requirements

- Survey for populations along the abandoned railway line from Brookton to Kweda.
- Survey population numbers 1, 5, 6 and 10 to confirm numbers.
- Survey for new populations on adjacent conservation reserves with similar soil types.

References: Hopper, (1987).



Billardiera sp. *Dryandra* D.M. Rose 397

PITTOSPORACEAE

A small erect to slightly straggling shrub, to 40 cm tall. The corolla is white in colour with purple stripes. The leaves are yellowish-green and toothed toward the apex. The flowers occur mostly in the leaf axils. They are solitary on the uppermost branchlets.

Flowering period: October. Total flowering period uncertain.

Distribution and Habitat in the Narrogin District

B. sp. Dryandra is only known from the Dryandra State Forest. It occurs in a broad gully or saddle in light pinkish brown gravelly clay loam over laterite in woodland with *Eucalyptus accedens* and *E. astringens*.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|------------|-------------|-------|-------------|---------------|-----------|
| 1 Dryandra | 19/10/87 | Wil | SF | Occasional | Unknown. |

Wil Shire of Williams.

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

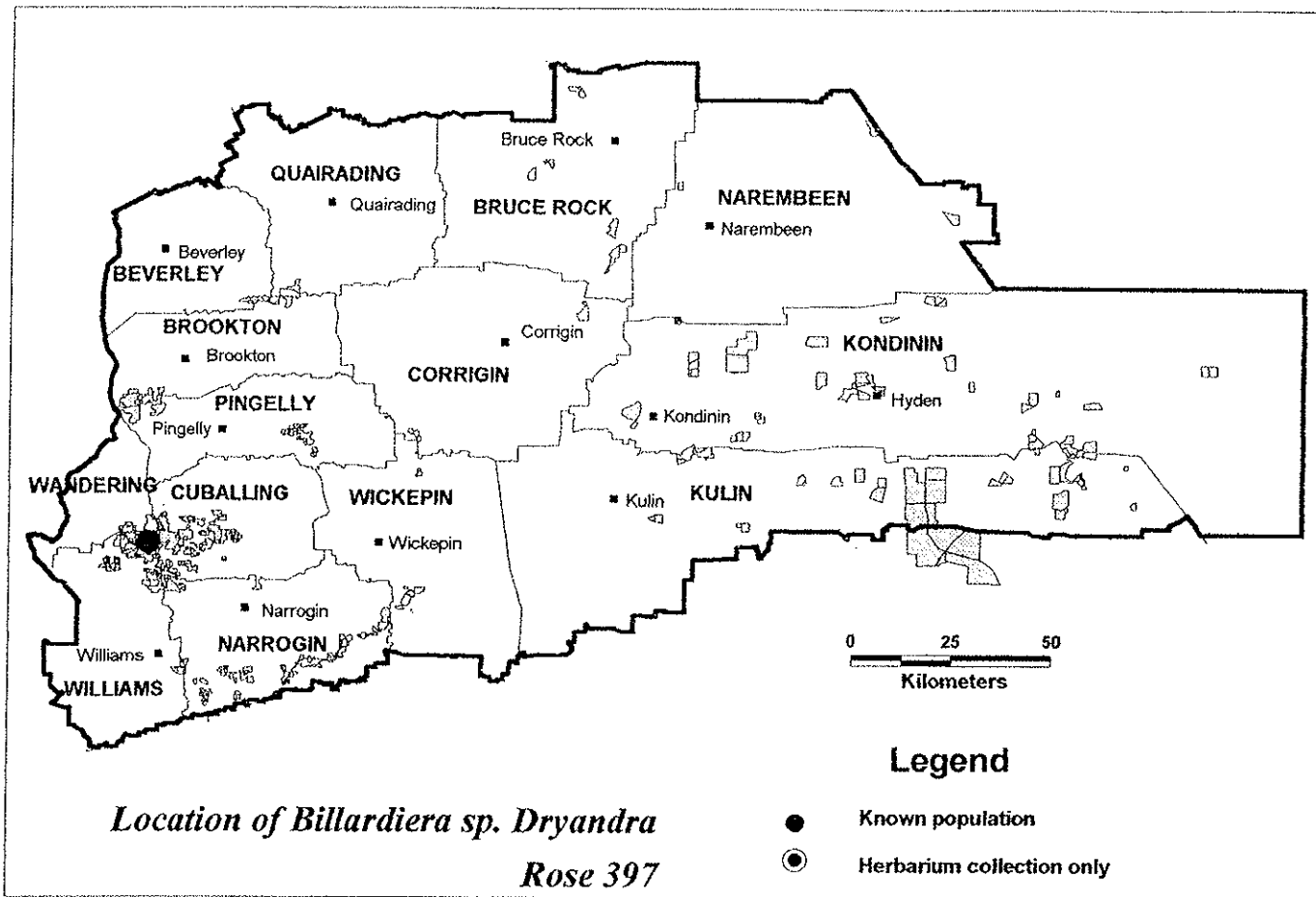
Management Requirements

- Protect the population location from forest management operations.

Research Requirements

- Survey to relocate population number 1 in Dryandra State Forest.
- Survey for additional populations within Dryandra State Forest and surrounding conservation reserves. Search in areas containing deeply weathered granitic rock with broad valley topographic locations (for example broad valleys or saddles).

References



Boronia capitata subsp. *capitata* Bentham

RUTACEAE

A medium spreading boronia scented sub-shrub to 1.3 metres tall with branchlets and leaves shaggy with soft hairs. The 5-15 mm long leaves are long and narrow, to semi-cylindrical shaped sometimes flat above. The bracteoles are similar to leaves. The flowers are found in compact terminal heads on short thick stalks. The stamen stalk is about 4 mm long and densely hairy. The sepals are hairy with a thickened apex. The petals are hairy outside in centre. The pink flowers are terminal on the end of branchlets. The species name refers to the flower cluster at the end of branchlets.

Flowering period: August - February.

Distribution and Habitat in the Narrogin District

Only known from the Tutanning area, east of Pingelly. It grows under wandoo woodland, associated with *Dryandra sessilis*, *Banksia sphaerocarpa*, *Melaleuca* sp., *Xanthorrhoea* sp., and *Petrophile* sp. in patches of white sand associated with laterite ridges and break-aways.

Conservation Status

Current: Priority 2[#]

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|--------------|-------------|-------|-------------|---------------|---|
| 1* Tutanning | 12/1962 | Pin | ?NR | ? | Not relocated. May be same location as pop. number 2. |
| 2 Tutanning | 04/08/95 | Pin | NR | 65+ | Healthy |

Pin Shire of Pingelly

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

Management Requirements

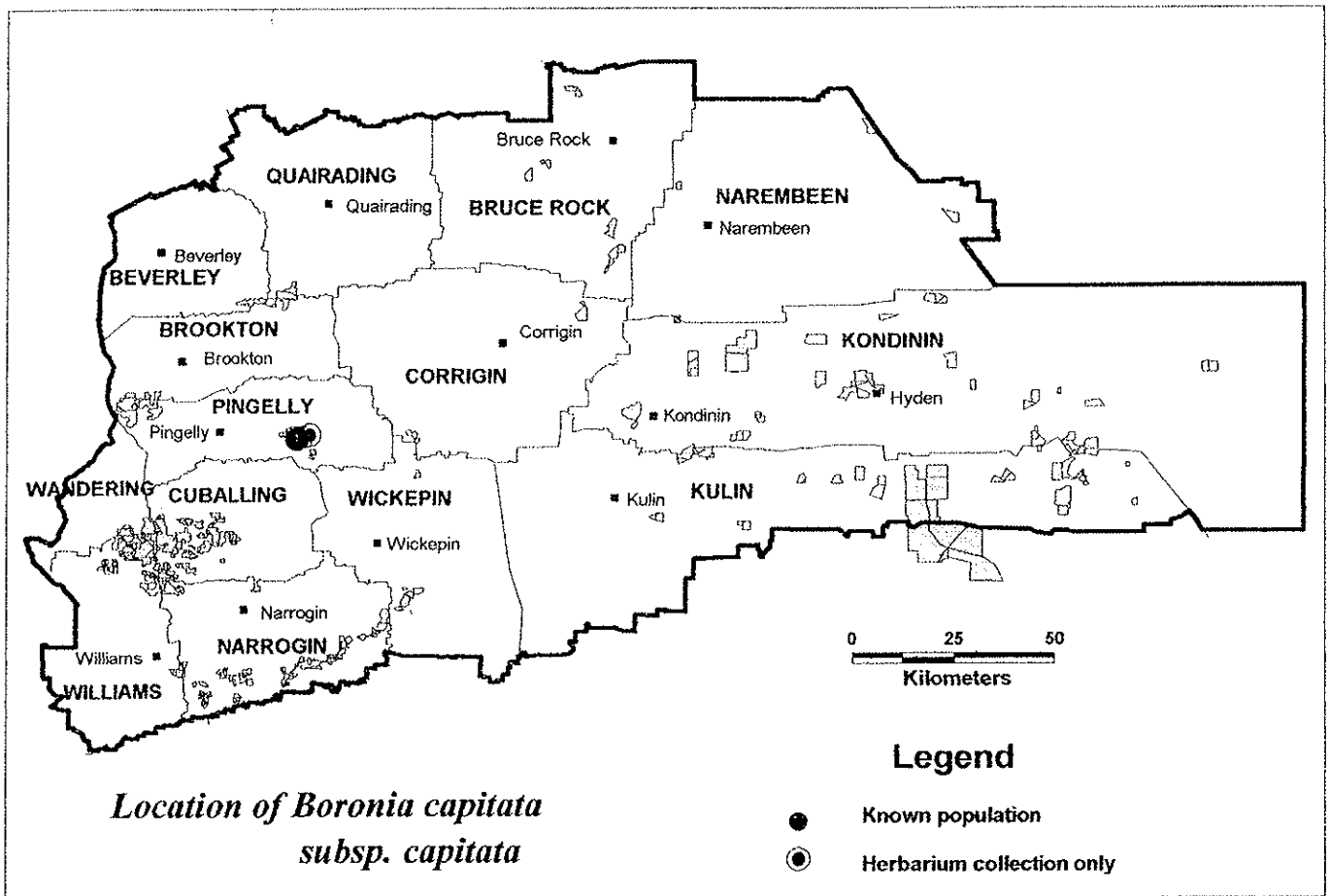
- Monitor known population occasionally.
- Ensure protection of population during reserve management operations.

[#] now Declared Rare Flora (updated at December 1999)

Research Requirements

- Survey opportunistically for new populations on similar habitat types.

References Wilson (personal communication), Bentham (1863).



Chamelaucium croxfordiae Marchant & Keighery ms.

MYRTACEAE

An erect, slender-compact shrub to 1 metres tall, sometimes densely branched at the base. Young branches are reddish brown in colour with raised glands. Leaves are dull green, linear shaped and opposite, with successive pairs at right angles to each other. The leaf surface away from the axis is deeply convex and frequently with glandular dots. The raceme has 2-8 flowers or may be sometimes solitary. Flowers are 7-12 mm diameter, the floral tube is light green, 4.5-6 mm long. The corolla lobes are creamy white or tinged pink, becoming red-purple.

Flowering period: September - November.

Distribution and Habitat in the Narrogin District

Known only from the Narrogin District, occurring at Mawson, Boyagin Rock, Dryandra State Forest and the Dongolocking area. It is found growing in open scrub and low open *E. wandoo* woodland. It has been recorded in sandy loam, loamy sand, stony sandy clay and laterite.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-----------------|-------------|-------|-------------|---------------|-----------|
| 1 Boyagin Rock | 05/11/92 | Bro | NR | 1 | Healthy |
| 2* Boyagin Rock | 26/10/84 | Bro | NR | Common | Unknown. |
| 3* Boyagin Rock | 18/10/77 | Bro | NR | ? | Unknown. |
| 4* Dryandra | 21/09/87 | Wil | SF | Frequent | Unknown. |
| 5* Dryandra | 23/03/85 | Wil | SF | Scarce | Unknown. |
| 6 * Mawson | 28/10/83 | Qua | ? | Abundant | Unknown. |
| 7 Dongolocking | 02/11/93 | Wic | NR | Rare | Healthy |

Bro Shire of Brookton

Wil Shire of Williams.

Qua Shire of Quairading

Wic Shire of Wickepin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

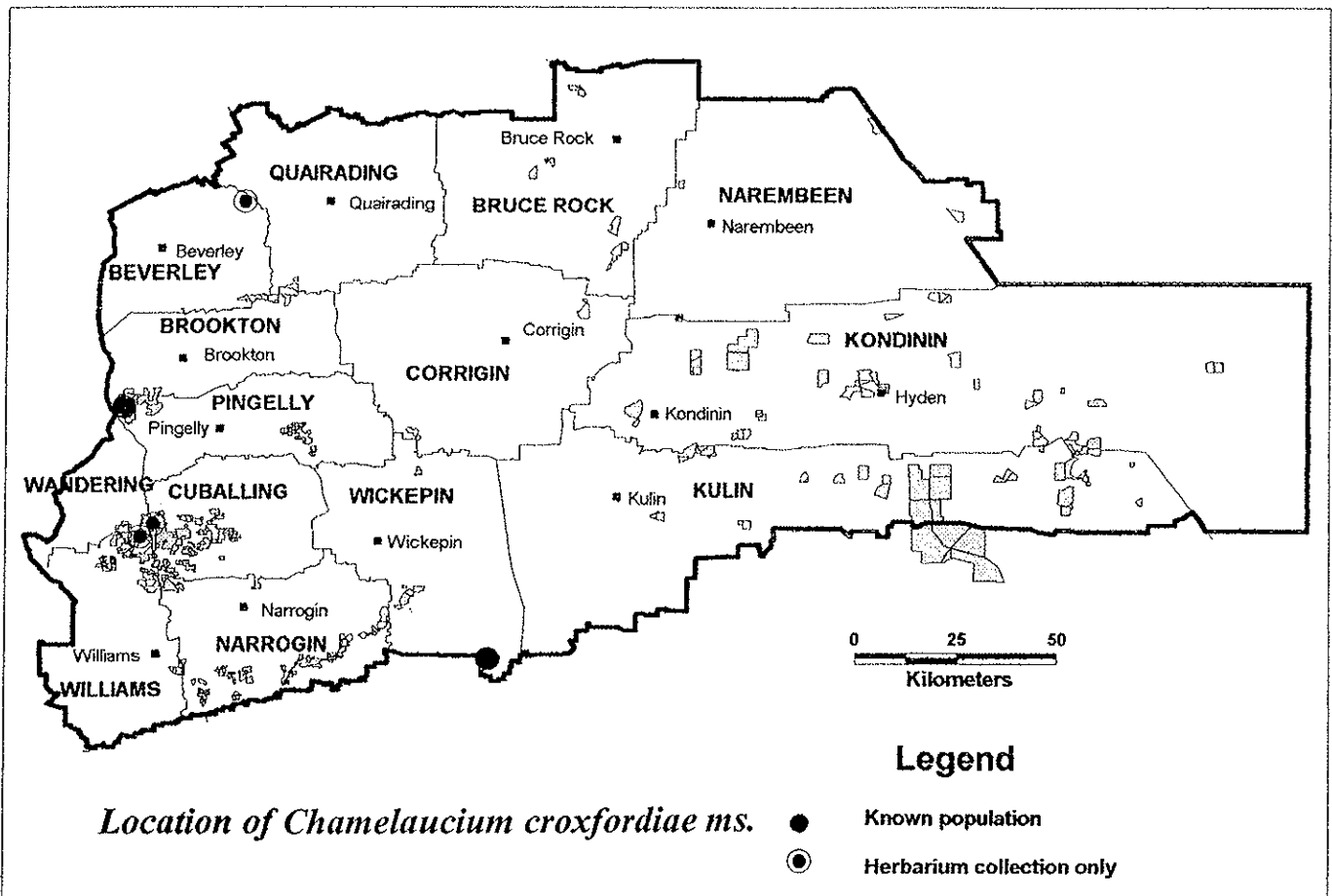
Management Requirements

- Ensure population number 1 and 7 are adequately protected from reserve management operations.

Research Requirements

- Survey to locate population number 2, 3 4, 5, and 6 to confirm numbers and condition.

References Marchant & Keighery (personal communication).



***Daviesia elongata* Benth. subsp. *implexa* Crisp ms.**

PAPILIONACEAE

A domed, many stemmed, rounded, perennial, woody, pea flowering shrub to 1.0 metres tall and 2 metres wide, with ribbed, slightly roughened branchlets and spirally twisted alternate leaves to 10 cm long. The pea flowers yellow and red. The seed pods are triangular.

Flowering period: Presumed from September to January.

Distribution and Habitat in the Narrogin District

Occurs from the Newdegate area north- east to near Lake Cronin and westwards to near Kulin and near Tarin Rock. It may be found on undisturbed or disturbed sites associated with low heath on gravelly white sand over laterite, ironstone, on gentle undulating plains. It may be associated with *Grevillea eryngoides*, *Allocasuarina campestris*, *Melaleuca cuneata*, *Beaufortia puberula*, *Daviesia cardiophylla* and *Dampiera sacculata*

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|------------------------|-------------|-------|-------------|---------------|--------------------------|
| 1 Hopkins | 05/04/90 | Kul | NR | Few | On fringe of gravel pit. |
| 2* West of Lake Cronin | 03/11/79 | Kon | VCL | Frequent | Unknown. |
| 3* SE of Kulin | 08/07/77 | Kul | ? | ? | Unknown. |

Kul Shire of Kulin

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

Appears to respond favourably to mechanically disturbed sites. Therefore, may also respond favourably to fire.

Susceptibility to *Phytophthora* Dieback

Unknown.

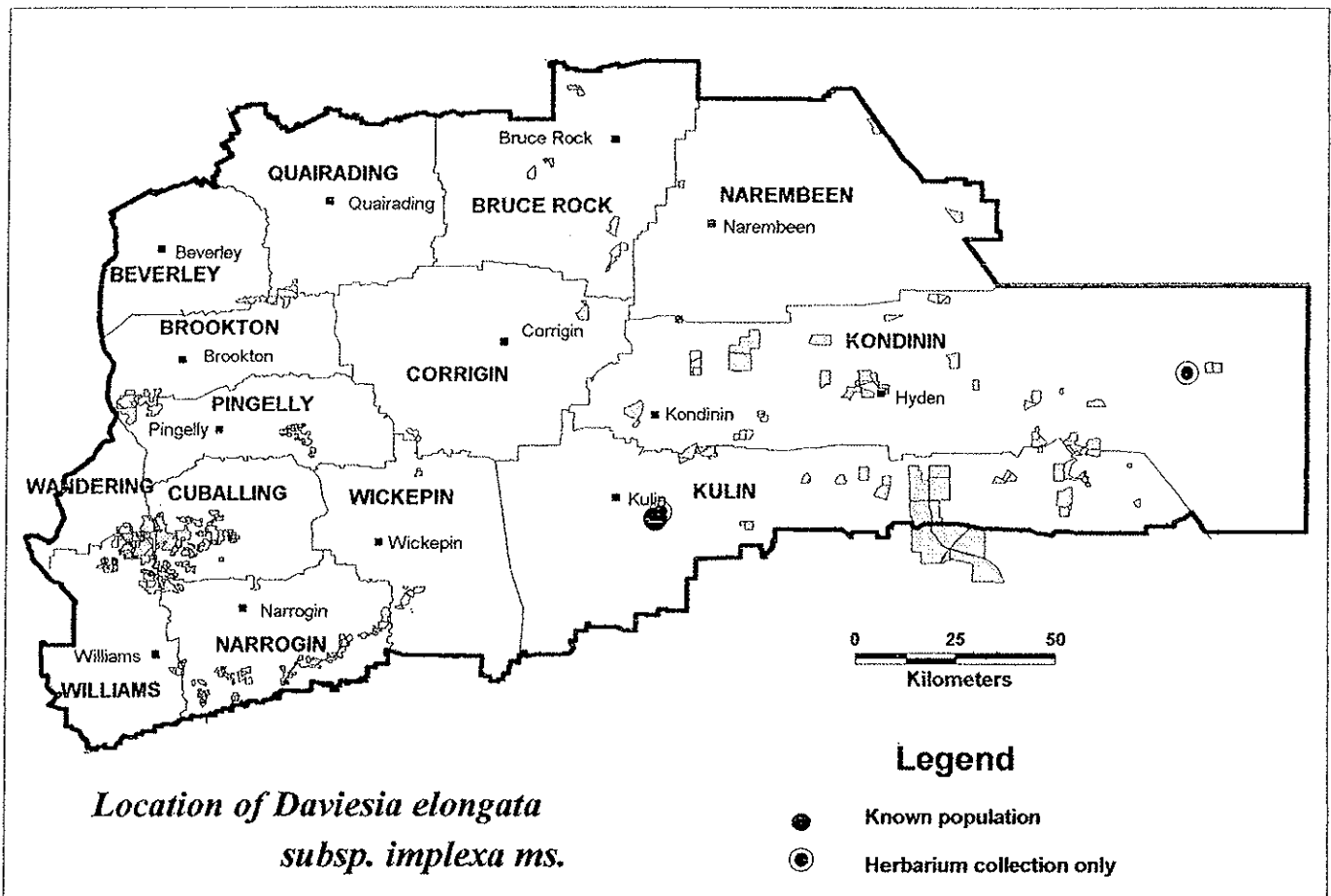
Management Requirements

- Ensure population 1 is protected during reserve management operations.

Research Requirements

- Survey to relocate known populations in the District.
- When relocated survey for new populations on adjacent conservation reserves.

References



Daviesia rhizomata Crisp ms.

PAPILIONACEAE

D. rhizomata ms. is a low 0.5 metre tall pea flowering shrub with numerous tuft like stems arising from a lignotuberous root stock. The rhizomes spread out to establish new plants. The branchlets are somewhat zigzagging. The phyllodes are scattered, spreading widely or bent backwards or downwards, slightly recurved with pointed tips. There are 1 or 2 racemes per axil, and are 1 flowered. The 1-3 mm flower stalk long is bent like a knee. The flowers have a gaping appearance. The calyx is 4-5 mm long. The corolla wings are about 7 mm long, red with yellow tips. The 13 mm x 7 mm pods are somewhat inflated. The species name refers to the rhizomes by which the plant spreads to form colonies. There are so many produced that the plant forms networks of interconnected tufts and clumps.

Flowering period: January - February.

Distribution and Habitat in the Narrogin District

Reported from 5 locations in the vacant Crown land east of Hyden, occurring in tall heath on yellowish sand over laterite. Only one location, north east of Marble Rocks, is represented in the W.A. Herbarium. The exact location of the other recordings are not known.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|--------------------|-------------|-------|-------------|---------------|-----------|
| 1* NE Marble Rocks | 29/01/79 | Kon | ? | Rare | Crisp |

Kon Shire of Kondinin
* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

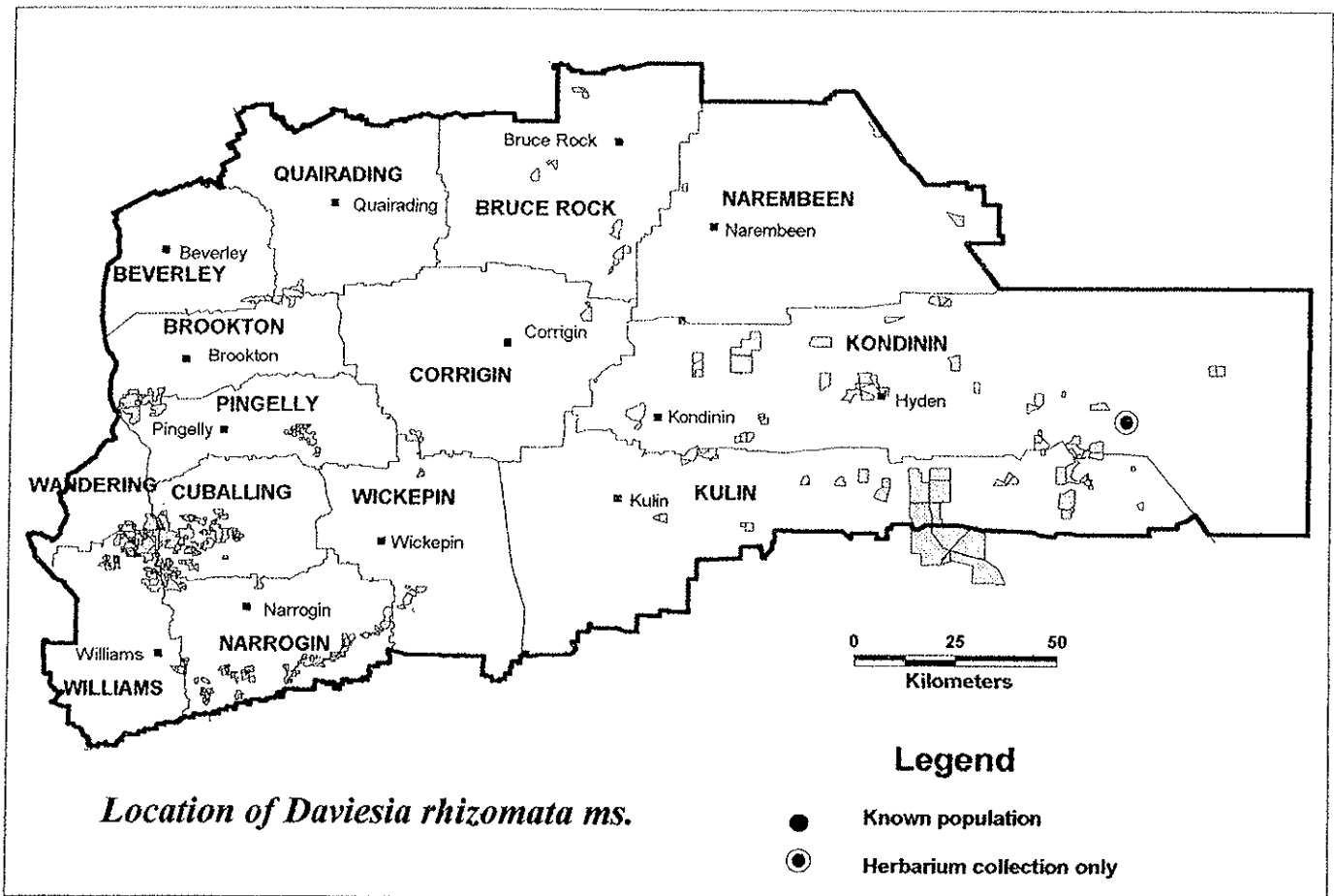
Management Requirements

– Nil until populations located.

Research Requirements

- Survey to relocate population number 1 near Marble Rocks.
- Obtain collection location information from M. Crisp concerning the other populations recorded.
- Survey for new populations, with yellowish sand over laterite soil types, on conservation reserves and vacant Crown Land east of Hyden.

References Crisp, M.D.(in prep).



Dryandra cynaroides Gardner

PROTEACEAE

A single-stemmed lignotuberous shrub to about 1.7 metres tall with erect stems. The leaves are bunched on the stem and are covered with hairs on the underside, widening upwards with leaf lobes cut halfway to the midrib and ending in a sharp point, 4-8 cm long and 7-13 mm wide. The leaf margins are strongly recurved with 3-8 lobes each side of the leaf. The inflorescence occur at the ends or in the axil of the leaf. The 3-6 cm long flowers are yellow in colour with 15-20 flowers per head. The perianth is white and dull gold in colour, up to 5.5 cm long and silky above the base.

It is named is derived from the Latin word *cynara*, like an artichoke.

Flowering period: June - August, October - February.

Distribution and Habitat in the Narrogin District

D. cynaroides has a wide distribution, occurring from Mount Caroline southwards to near Katanning. It has been collected from six locations in the Narrogin District. It is a common species within its habitat, growing in sandy laterite gravel and sand in association with low scrub and heath vegetation with other *Dryandra* species.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|--------------------|-------------|-------|-------------|---------------|----------------|
| 2* Boyagin Rock | 13/06/69 | Bro | NR | ? | Unknown. |
| 3 Dongolocking | 02/11/93 | Wic | NR | Common | Healthy |
| 4* Yeanilling Rock | 10/12/92 | Pin | ? | Nil | Not re-located |
| 5 Harrismith | 06/10/94 | Wic | SR | Nil | Not re-located |
| 6 Tutanning | 10/12/92 | Pin | NR | Common | Healthy |
| 8 Dryandra | 07/10/92 | Wil | SF | 100+ | Moderate |
| 9 Dryandra | 07/10/92 | Wil | SF | Common | Healthy |
| 10* Dongolocking | 18/07/85 | Wic | NR | ? | Unknown. |
| 11* Dongolocking | 18/07/85 | Wic | NR | ? | Unknown. |
| 13* Birdwhistle | 18/07/85 | Nar | NR | ? | Unknown. |
| 16* Harrismith | ? | Wic | RVM | ? | Unknown. |
| 17*Harrismith | ? | Wic | SR | Common | Unknown. |

Bro Shire of Brookton

Wic Shire of Wickepin

Pin Shire of Pingelly

Wil Shire of Williams

Nar Shire of Narrogin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Presumed susceptible.

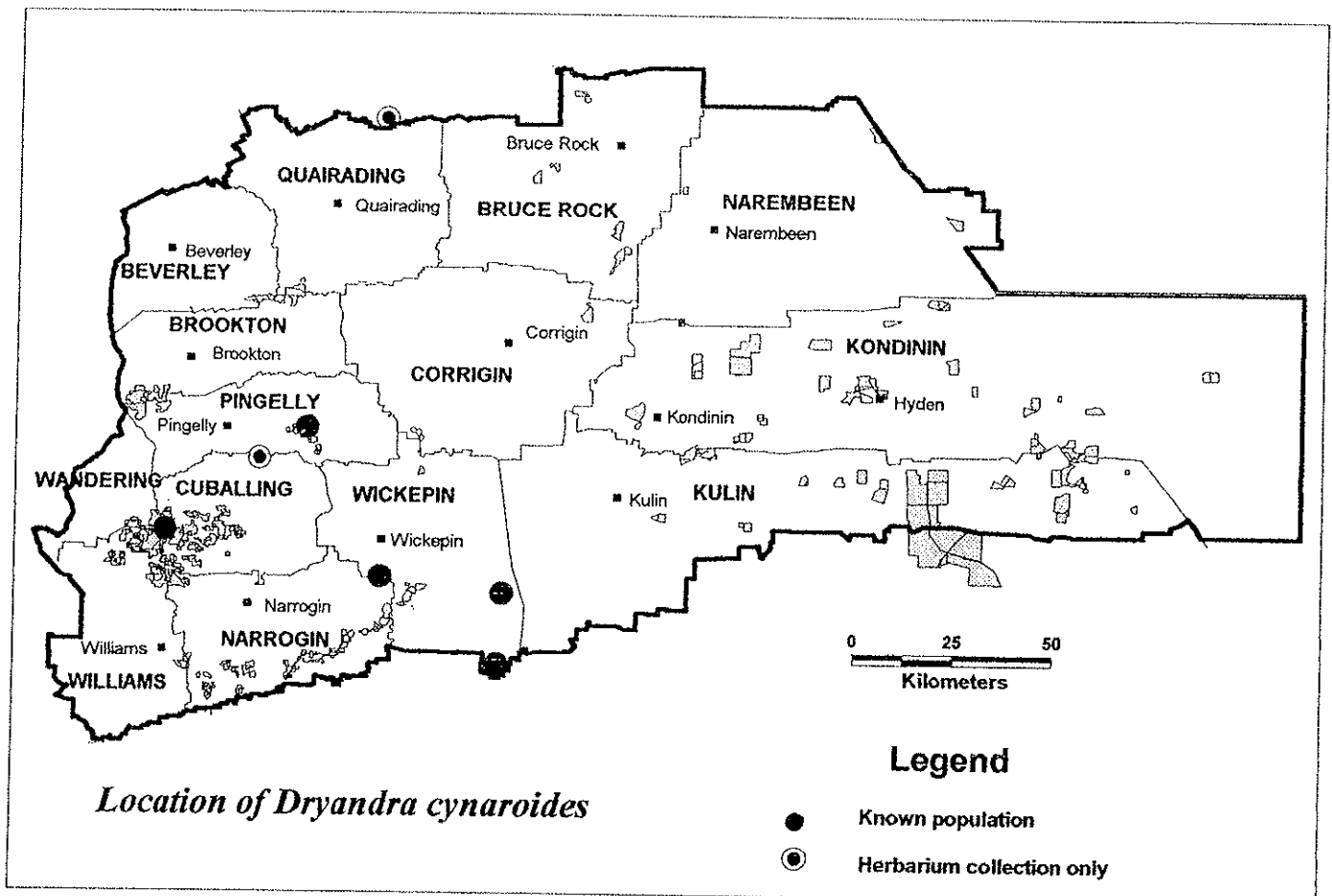
Management Requirements

- Monitor known populations occasionally.

Research Requirements

- Survey to confirm the location of population number 10, 11, 13, 16 and 17.

References Gardner (1964), Sainsbury (1987) and George (personal communication).



Dryandra epimicta A.S. George

PROTEACEAE

A small lignotuberous shrub usually less than 1 metre tall with prostrate stems. The stem surface is hairy, with broadly linear prophylls at the base of annual growth. The crowded 11-33 cm long and 7-14 mm wide leaves are linear, erect. They are also acute, sharply pointed with white hairs below and with revolute margins. The 10-35 broadly falcate 6mm long leaf lobes are pointed and are cut into the leaf half the distance or more to the midrib. The 8-9 cm long inflorescence is terminal, ascending. The involucral bracts are oval to broadly linear shaped. There are 45-70 flowers per head. The perianth is curled and 43-52 mm long. The 45-58 mm pistil is curved, the pollen presenter narrow ribbed and 4-5 mm long. The species name refers to the flowers that have a strong unpleasant smell that usually attract many blowflies. The inflorescence slightly resembles the shape of a small dead bird.

Flowering period: August -September.

Distribution and Habitat in the Narrogin District

Confined to one nature reserve south east of Kulin, consisting of three small sub populations, growing on flat broad yellowish, sandy loam plateau in low kwongan and tall open shrubland. Associated species may include *Banksia sphaerocarpa*, *Allocasuarina humilis*, *Isopogon* sp., *Hakea* sp., *Verticordia acerosa*, *Hibbertia* sp., *Jacksonia* sp., *Lepidosperma* sp. and *Platysace maxwellii*

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-----------------------|-------------|-------|-------------|---------------|-------------|
| 1 South east of Kulin | 16/09/93 | Kul | NR | <100 | Undisturbed |

Kul Shire of Kulin

* population known only as Herbarium record

Response to Disturbance

Unknown. Presumed to regenerate by resprouting from root stock and seed following a fire.

Susceptibility to *Phytophthora* Dieback

Presumed susceptible.

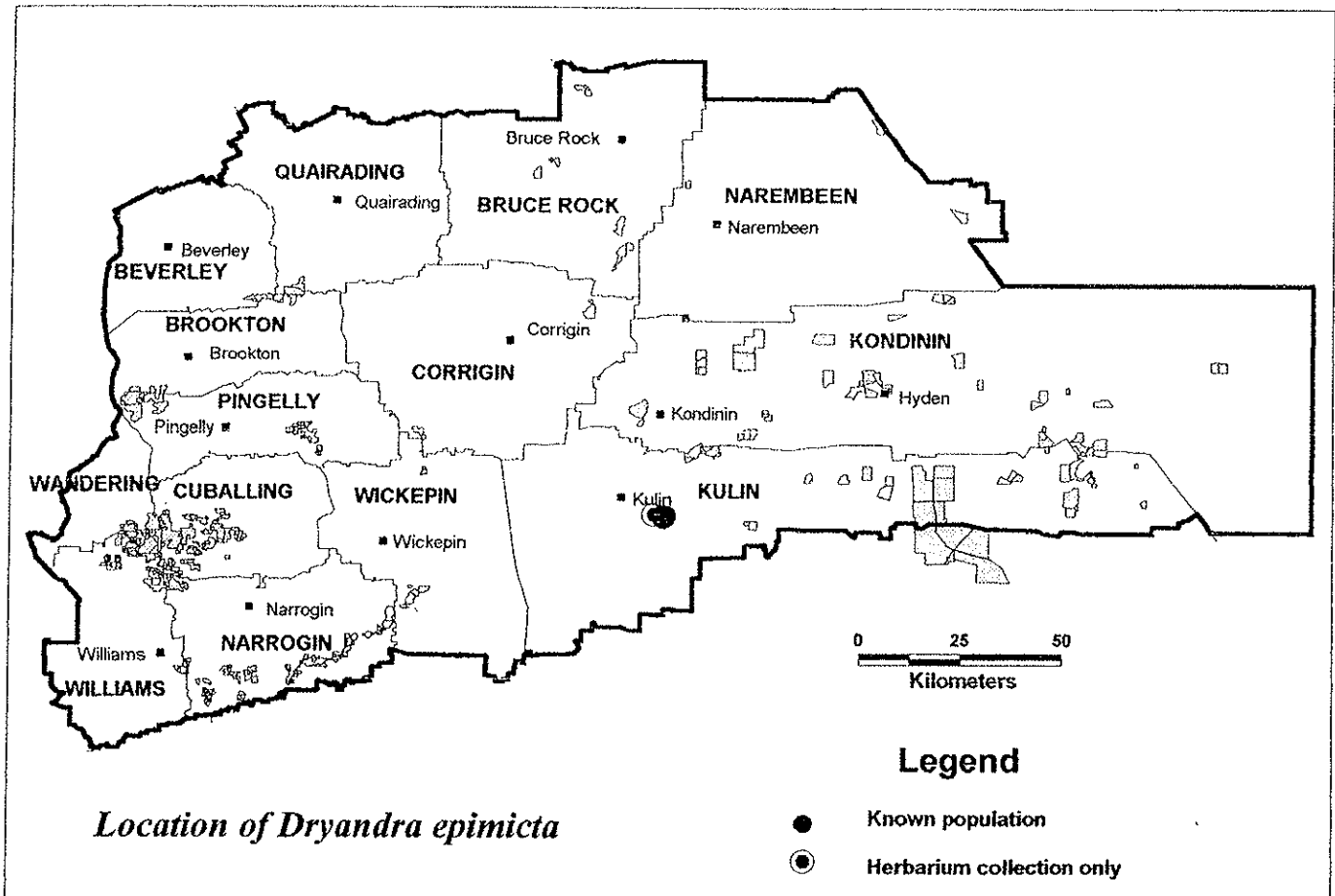
Management Requirements

- Ensure that known sub populations are not disturbed during reserve management operations.
- Inspect populations occasionally, record numbers and population condition.

Research Requirements

- Survey to locate additional populations in the District on similar soil types. Possible survey sites may include Bending, North Karlgarin, Roe, Scriveners and Dragon Rocks Nature Reserves.

References George (1996).



***Dryandra erythrocephala* C.A. Gardner**
var. *inopiniata* A.S. George

PROTEACEAE

A lignotuberous shrub to 1.7 metres tall with dense foliage and multiple erect stems. The 6-11 cm long and 10-16 mm wide leaves have leaf lobes cut half way to the midrib, gently curved, pointed, woolly below, and margins rolled backwards towards midrib. There are 2-6, 9 mm long and 18 mm wide U-shaped leaf lobes on each side of the leaf. The flower cluster is in the leaf axil and are terminal, often clustered. There are 17-24 flowers per head. The perianth is 26-27 mm long, straight and yellow in upper third.

D. erythrocephala var. *B* (44) is distinguished from *D. erythrocephala* var. *erythrocephala* by a shorter perianth that is yellow in the upper third.

The species is named after the Latin word *erythrocephalus*, meaning red head.

Flowering period: April.

Distribution and Habitat in the Narrogin District

D. erythrocephala var. *B* (44) occurs near Kulin and Nyabing and is reported to occur near Harrismith. It grows in gravelly clay and gravelly white sand, near the contact of reworked sandplain and colluvium geological types. It grows in association with large shrubs including *Dryandra ferruginea* and *D. sp. aff. cirsioides*.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-----------------|-------------|-------|-------------|---------------|----------------------------------|
| 1 Kulin | 16/09/93 | Kul | NR | Common | Healthy |
| 2 101 Gate Road | | Kul | ? | ? | Unknown. Unconfirmed location |
| 3 101 Gate Road | | Kul | ? | ? | Unknown. Unconfirmed location |

Kul Shire of Kulin
* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Presumed susceptible.

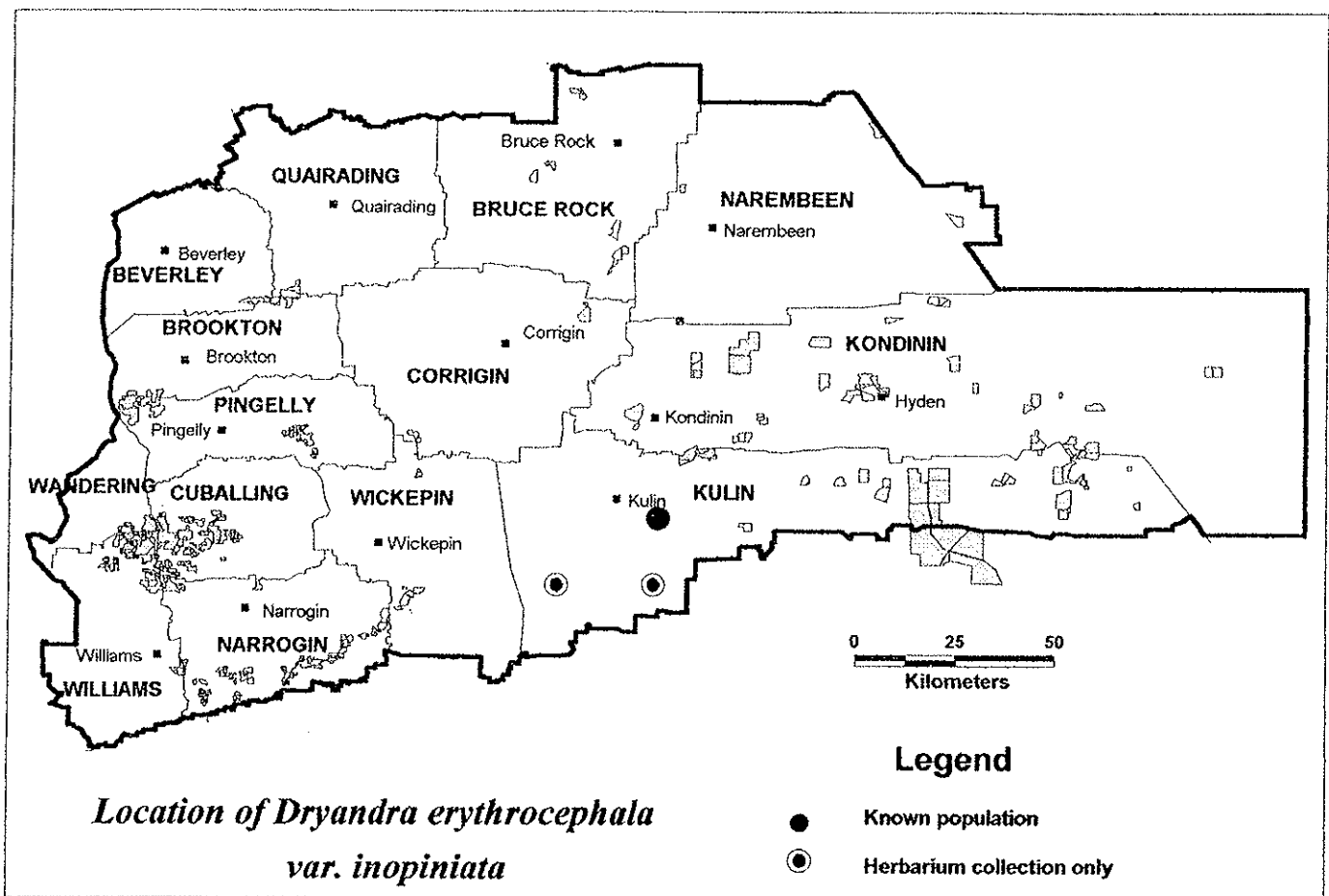
Management Requirements

- Monitor known populations occasionally.

Research Requirements

- Confirm location of populations 2 and 3.

References: George, A.S. (Personal communication).



Dryandra meganotia A.S. George ms.

PROTEACEAE

An erect lignotuberous prickly shrub to 1.0 metre high with upright stems covered with matted hairs. The 3 -7 cm long and 10-25mm wide leaves usually have the midrib curved. There are 6-10 long and narrow, sharp, leaf lobes each side, cut at about 80-90 degrees and ending in a point. The leaf margins are rolled backwards towards the midrib. The flowers are yellow. the bract whorls are blunt, silky on the margins, otherwise hairless except for a few short hairs towards the apex. The 2.5 mm long floral bracts are long and narrow. The densely silky perianth is 22-23 mm long. The limb is 5-6.2 mm long, the pistil 26-29 mm long, the pollen presenter 3-4 mm long. The species name refers to the likeness to the genus of *Serratula*.

Flowering period: August and September.

Distribution and Habitat in the Narrogin District

Two populations are known to occur in the Narrogin District, in the Yilliminning - Toolibin area. It is found growing in sand or brown lateritic clayey sand, in open woodland and shrubland in association with *Allocasuarina huegeliana*. This species always grows in association with granite with *A. huegeliana*, even where granite is not observed out-cropping.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|---------------|-------------|-------|-------------|---------------|---------------|
| 2* Harrismith | 08/12/93 | Kul | RVS | Nil | Not relocated |
| 3 Track Rd | 02/11/93 | Nar | RVS | 100+ | Good |

Kul Shire of Kulin

Nar Shire of Narrogin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

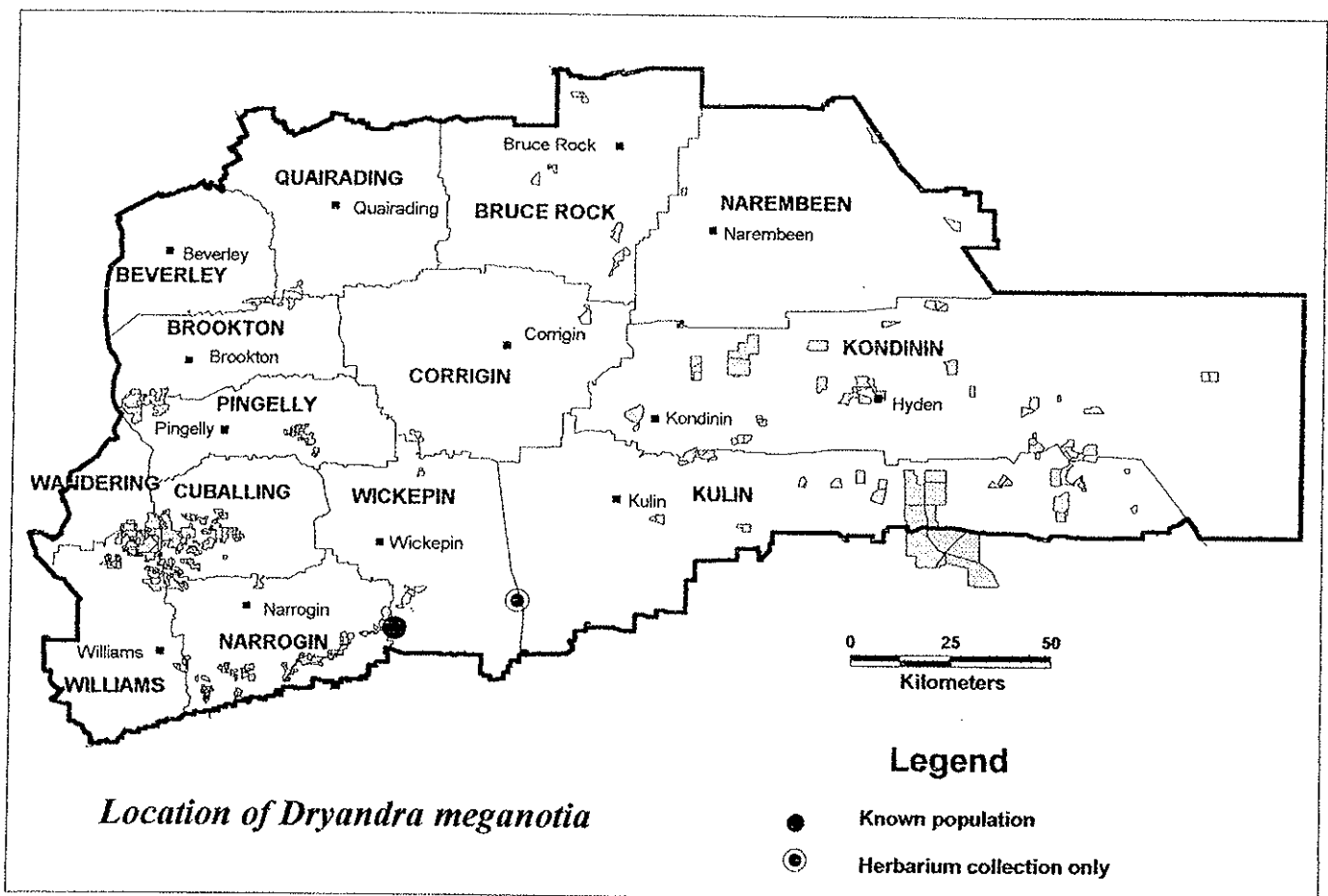
Management Requirements

- Nil until populations relocated.

Research Requirements

- Survey to relocate known populations in the District.
- When relocated survey for new populations from non Herbarium collections at Harrismith, Yilliminning Rock and Jitarning.
- Survey within known range to establish populations on conservation reserves.

References George (Personal communication), Peroni (Personal communication).



***Eucalyptus sparsicoma* Brooker and Hopper**

MYRTACEAE

A slender stemmed mallee to 5 metres tall with narrow leaves and a small terminal crown. An unusual appearance is that sometimes the western side of the stems are covered with ribbons of rough bark while the eastern sides are smooth pinkish grey and light grey. The pith of the branchlets is glandular. The 7 cm long and 2.5 cm wide, blue-green seedling leaves remain opposite for 2 pairs, then become alternate, elliptical to ovate, The uniformly coloured, 7cm long by 0.9 cm wide adult leaves are narrowly lanceolate, glossy and green. Axillary inflorescences are unbranched and have up to 11 creamy -white flowers. The peduncles are flattened and up to 1 cm long. The 1cm long and 0.3cm wide, have spindle shaped buds and have a pedicel and the operculum is distinctly narrower than the hypanthium. Some outer stamens are erect while the inner ones may be bent downwards towards the axis. The 0.8 cm long and 0.5 cm wide fruit have pedicels and are cup shaped with valves not exerted. The seed is light grey-brown. The species name refers to the sparse crown of leaves.

Flowering period: March.

Distribution and Habitat in the Narrogin District

Known from just east of Tincurrin southwards to Lake Chinocup, where it grows in white or pale brown sand or sandy loam on flat to gently sloping terrain. It forms an emergent shrub mallee formation with *E. scyphocalyx*, *E. aff. flocktoniae*, *E. aff. occidentalis* and *E. phaenophylla* subsp. *phaenophylla* over heath or low scrub of *Melaleuca uncinata*, sometimes over a *Borya sphaerocephala* herb field.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|--------------|-------------|-------|-------------|---------------|-----------|
| 1* Tincurrin | 12/12/88 | Wic | RVS | ? | Brooker |

Wic Shire of Wickepin
* population known only as Herbarium record

Response to Disturbance

Possibly will re-sprout from a rootstock and re-seed following a fire.

Susceptibility to *Phytophthora* Dieback

Unknown.

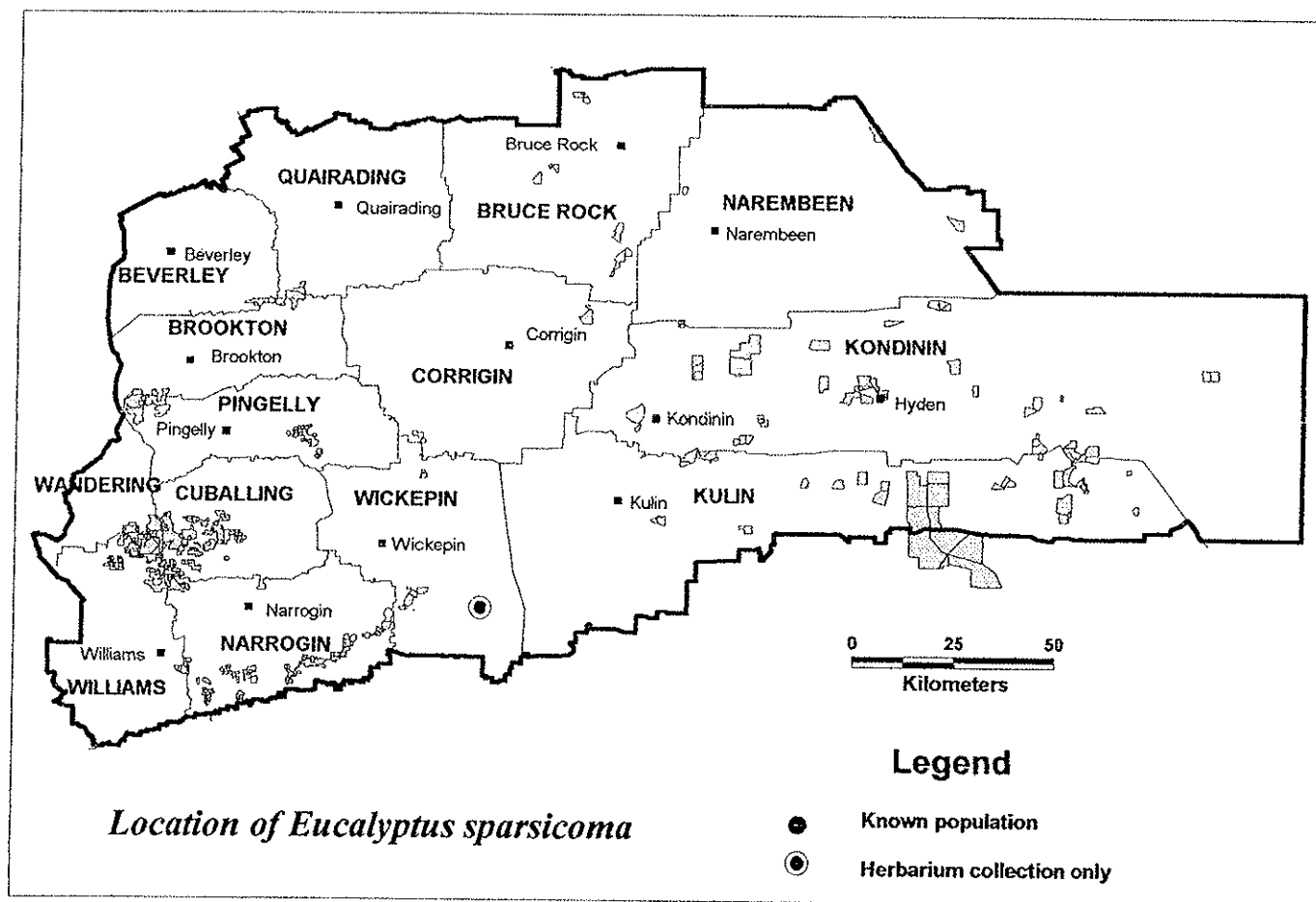
Management Requirements

1. Nil until populations relocated.

Research Requirements

- Survey to relocate population number 1 in the District.
- When relocated survey for new populations on adjacent conservation reserves.

References Brooker & Hopper (1991).



Gastrolobium densifolium Gardner

PAPILIONACEAE

G. densifolium is a shrub 45-60 cm high with erect branches spread out from the base. The leaves are bright green with a yellow midrib, narrowly elliptic or lance-shaped, usually in threes, crowded on stem, rigid, and tough. The leaves taper at tip to a fine point which turns outward and are flanked by pair of dark stipules. The pea flowers are yellow with reddish centre, crowded into racemes at the end of branches. The calyx and young pods are covered with long, silky hairs. Distinguished from other species of *Gastrolobium* by the branches being marked by the persistent remains of leaf bases and stipules.

Flowering period: September - November.

Distribution and Habitat in the Narrogin District

Known from near Dudinin to Kukerin, eastwards to Lake Grace and the Dragon Rock Nature Reserve. It may be found on gradual slopes and in flat areas mainly in red to brown sandy clay loams., associated with lowland of *Eucalyptus astringens* and sometimes with *E. salmonophloia* and *E. albida*. It may occur on Alluvium or Colluvium geological soil types.

G. densifolium may have been more common and was possibly cleared because of the perceived toxic properties of the genus. However, no toxic compounds were isolated from this species.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-----------------|-------------|-------|-------------|---------------|-----------|
| 1 Dudinin | 06/10/94 | Wic | RWR | 100+ | Healthy |
| 2* Harrismith | 15/11/89 | Kul | ? | 20-50 | Unknown. |
| 9 Dragon Rocks | 1991 | Kul | NR | Occasional | Unknown. |
| 10 Dragon Rocks | 09/12/93 | Kul | NR | Occasional | Healthy |

Wic Shire of Wickepin

Kul Shire of Kulin

* population known only as Herbarium record

Response to Disturbance

May respond to fires and soil disturbance.

Susceptibility to *Phytophthora* Dieback

Unknown.

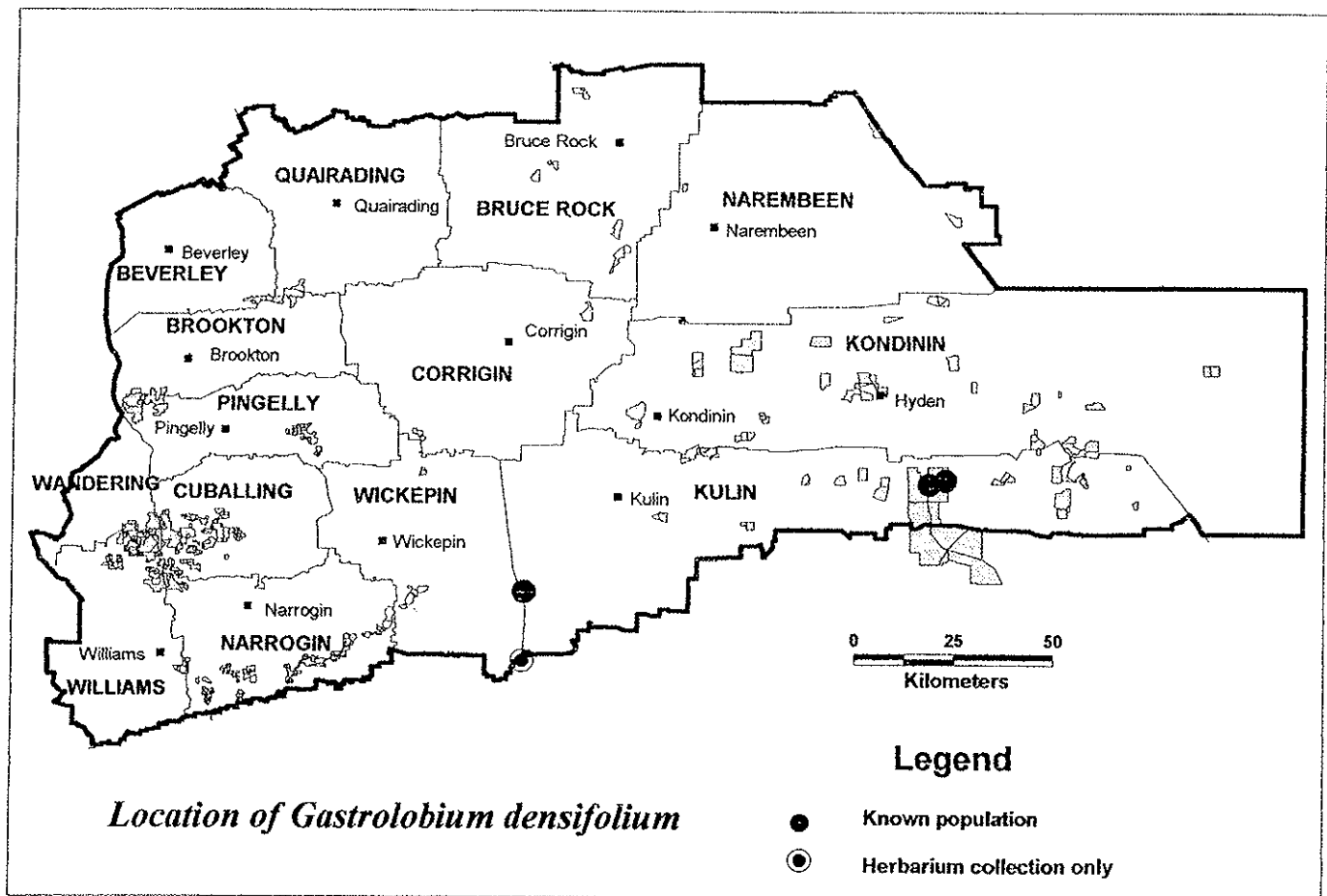
Management Requirements

- Notify Westrail concerning population number 1.
- Protect population number 9 and 10 during reserve management operations.

Research Requirements

- Survey and attempt to relocate population number 2.
- Survey for new populations on conservation reserves in the Dragon Rocks and Harrismith-Dudinin area.

References Sampson & Hopper (1990) Aplin (1973) Gardner & Bennetts (1956).



Gonocarpus ericifolius Orchard

HALORAGACEAE

G. ericifolius is a semi-woody multi-stemmed shrub often found in the vegetation layer under the dominant plant layer. It is 10-15 cm tall. The stems occur mainly at the base and have 0.4-0.5 mm, rough, simple, and moderately dense unicellular white long hairs. The alternate leaves are erect, stalkless, cylindrical and slightly tapered, 4.0-7.5 mm long and 0.7-1.0 mm wide. Leaves are arranged with segments overlapping in the lower parts of stem, and are more widely spaced and slightly channelled above, with a hair covering similar to the stems. Flowers are borne singly in the axils of reduced leaves (bracts). Flowers hang on hairless stalks. There are 4 red hooded, strongly keeled, clawed, 2.2 mm long and 0.6 mm wide petals with stiff semi-appressed hairs on the keel. The stamens number 8 with 4 styles. The ovary is dark grey. The fruit is shaped like a top and is densely hairy. The foliage resembles some *Erica* species, for example *E. baccans*.

Flowering period: January.

Distribution and Habitat in the Narrogin District

Known only from one collection in the Dragon Rocks Nature Reserve growing in tall heath with *Allocasuarina campestris*, on gravelly sand flats over laterite.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-----------------|-------------|-------|-------------|---------------|---------------|
| 1* Dragon Rocks | 10/12/93 | Kul | NR | Nil | Not relocated |

Kul Shire of Kulin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

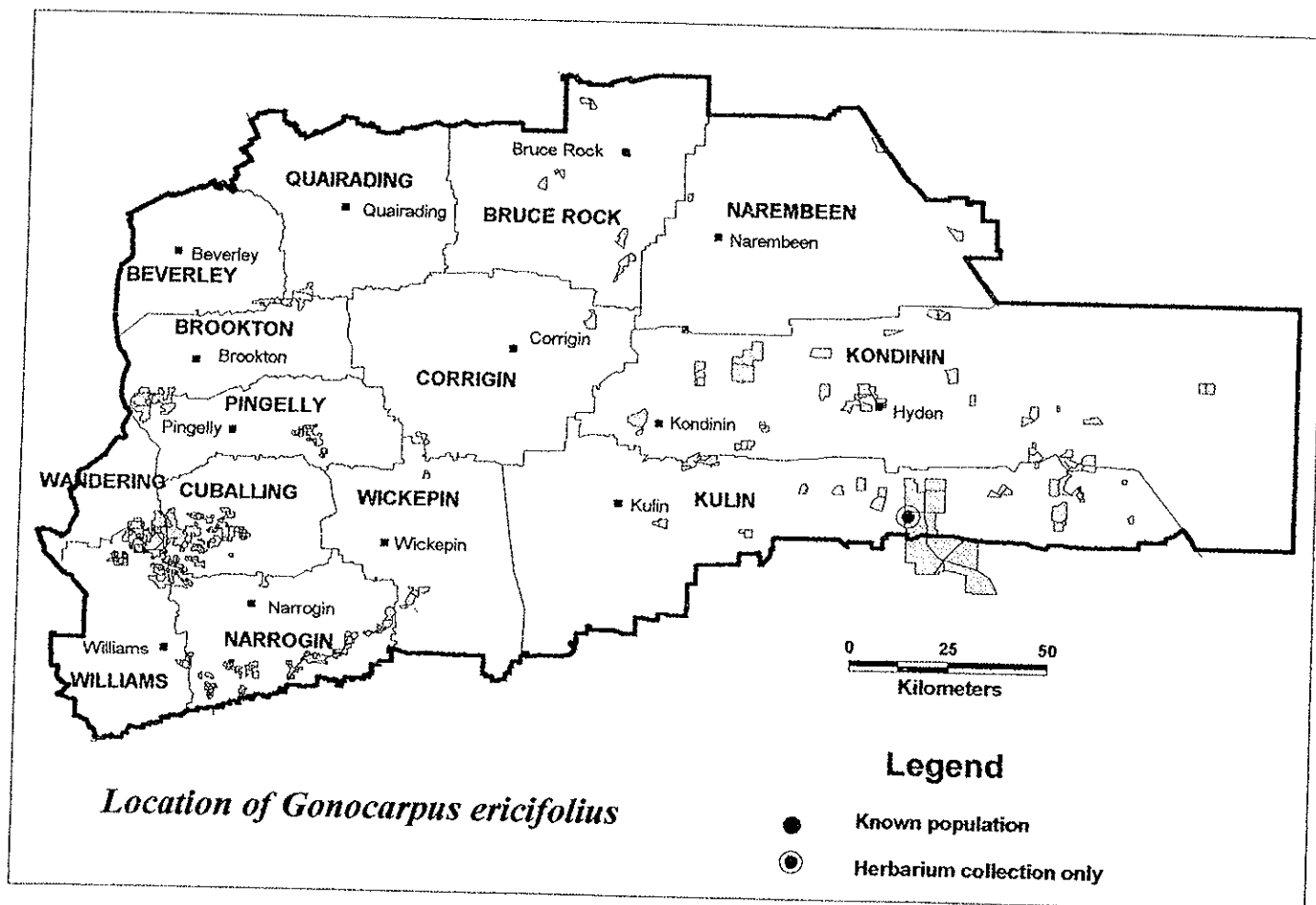
Management Requirements

- Ensure the location of this type collection is protected from reserve management operations.

Research Requirements

- Survey for population 1 and new populations within Dragon Rocks Nature Reserve and other adjacent conservation reserves.

References Orchard (1986).



Grevillea crowleyae Olde & Marriott

PROTEACEAE

G. crowleyae is a dense and spreading shrub, 0.5-1.5 metres high and up to 1.5 metres wide. When older, the plant may become open and spindly with leaves crowded on the upper branchlets. The grey bark is rough. The branchlets are rounded, occasionally angular and densely hairy to covered with soft downy hairs. The grey to grey-green leaves are 3-7 cm long, curving upward, and more or less without a leaf stalk. There are 3-7 leaf lobes per leaf, 10-42 mm long and 0.8 mm wide, straight to slightly hooked, and the spine is 0.8 mm long. The flower stalk is 1.5-2.5 mm long. The perianth is grey. The gently incurved style is maroon-black to red. The fruit is 3-16 mm long, 6-9 mm wide and 8-9.5 mm deep.

Flowering period: August - November

Distribution and Habitat in the Narrogin District

Only known from the Narrogin District, *G. crowleyae* has been collected from near Dardadine (south west of Williams.) and Dryandra State Forest, growing with wandoo, in upland sites of heavily laterised loam, in association with *Allocasuarina* sp., *Baeckea* sp., *Grevillea* sp., *Synaphea* sp. and *Calothamnus* sp.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-------------|-------------|-------|-------------|---------------|---------------|
| 1 Dardadine | 26/09/91 | Wil | ? | 15 | Fair |
| 2 Dardadine | 30/11/92 | Wil | TBR | 21 | Unknown. |
| 3* Dryandra | 04/10/94 | Cub | SF | Nil | Not relocated |

Wil Shire of Williams

Cub Shire of Cuballing

* population known only as Herbarium record

Response to Disturbance

Because of its occurrence in a gravel pit it may respond favourably to soil disturbance. Otherwise, its relationship to disturbance is unknown.

Susceptibility to *Phytophthora* Dieback

May be susceptible.

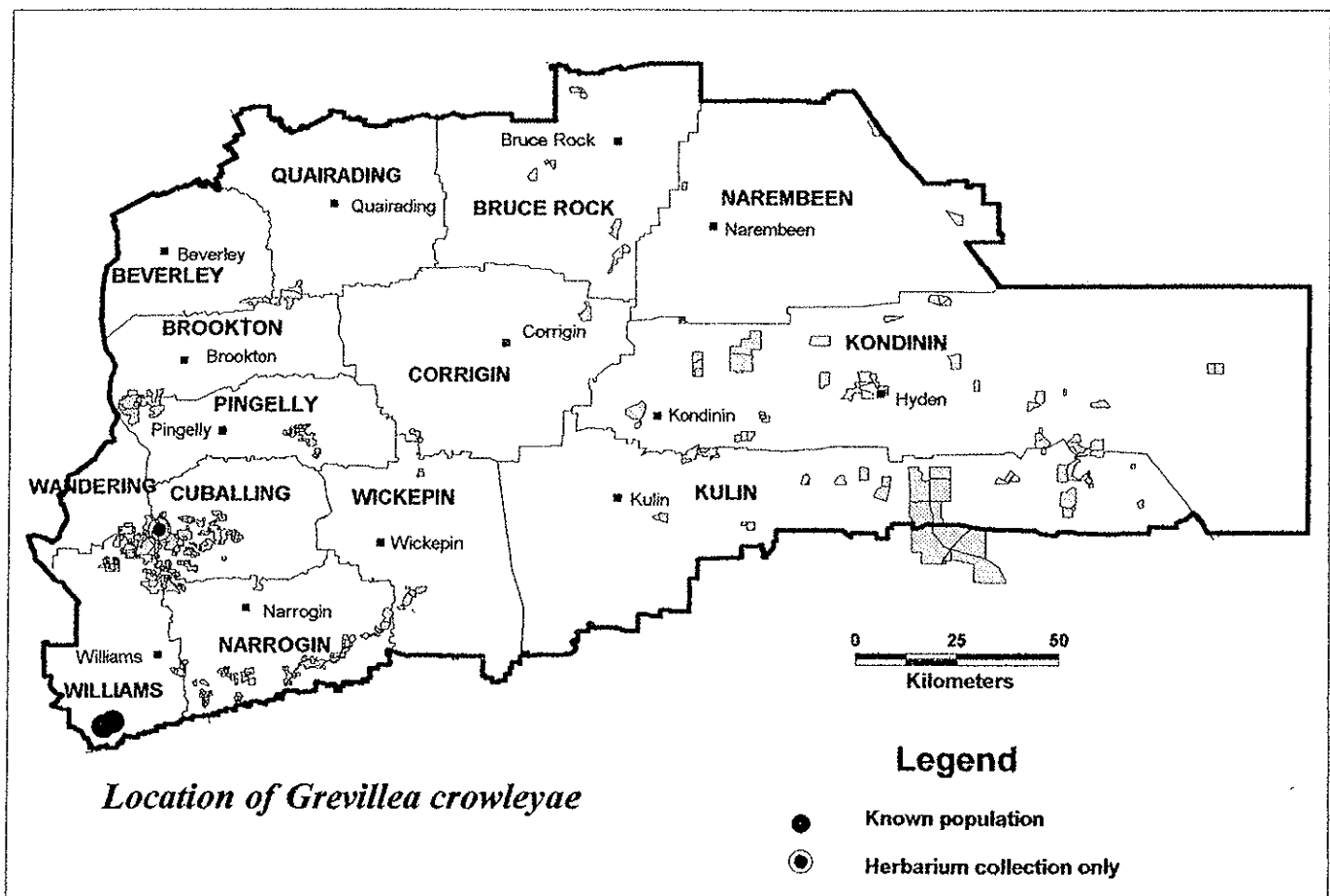
Management Requirements

- Ensure the location of population number 3 is protected during forest management operations.
- Monitor known populations to verify population numbers.

Research Requirements

- Survey for new populations in similar habitat especially in the Dryandra and Highbury State Forests.

References Olde & Marriott (1993).



Grevillea roycei McGillivray

PROTEACEAE

G. roycei is an erect open spreading, slenderly branched, 1-2 metres high shrub. The hairless branchlets are rounded and slightly rigid. The rigid leaves are three times divided with pointed lobes 0.7-3 cm long. Frequently the terminal lobe is simple and the primary lateral lobes are 2-3 lobed. The leaf margin is angularly revolute, usually enclosing the lower surface except for the mid-vein. The flowers are small and white in colour.

G. roycei resembles *G. spinosissima*, but the branches have no hair, are grey-green in colour and the spiny foliage is smaller.

Flowering period: August - October.

Distribution and Habitat in the Narrogin District

Known from north of Brookton and Goomalling, growing on yellow sand over laterite in open low woodland and heath of *Banksia prionotes*, *B. menziesii*, *Xylomelum* sp., *Eremaea pauciflora*, *Leptospermum* sp., *Dryandra* sp. and *Allocasuarina humilis*.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|--------------------------|-------------|-------|-------------|---------------|-----------|
| 4* East of Brookton | 31/10/79 | Bro | ? | ? | Unknown. |
| 5 Youraling | 30/08/94 | Bro | RWR | 11 | Healthy |
| 6 Eva's | 12/10/94 | Bro | PP | 6 | Healthy |
| 7 North east of Brookton | 27/04/94 | Bro | NR | 2 | Healthy |
| 8 Hobbs' | 12/10/94 | Bro | PP | 3 | Moderate |

Bro Shire of Brookton

* population known only as Herbarium record

Response to Disturbance

Appears to be a disturbance opportunist and may respond well to fire and mechanical disturbance.

Susceptibility to *Phytophthora* Dieback

Unknown.

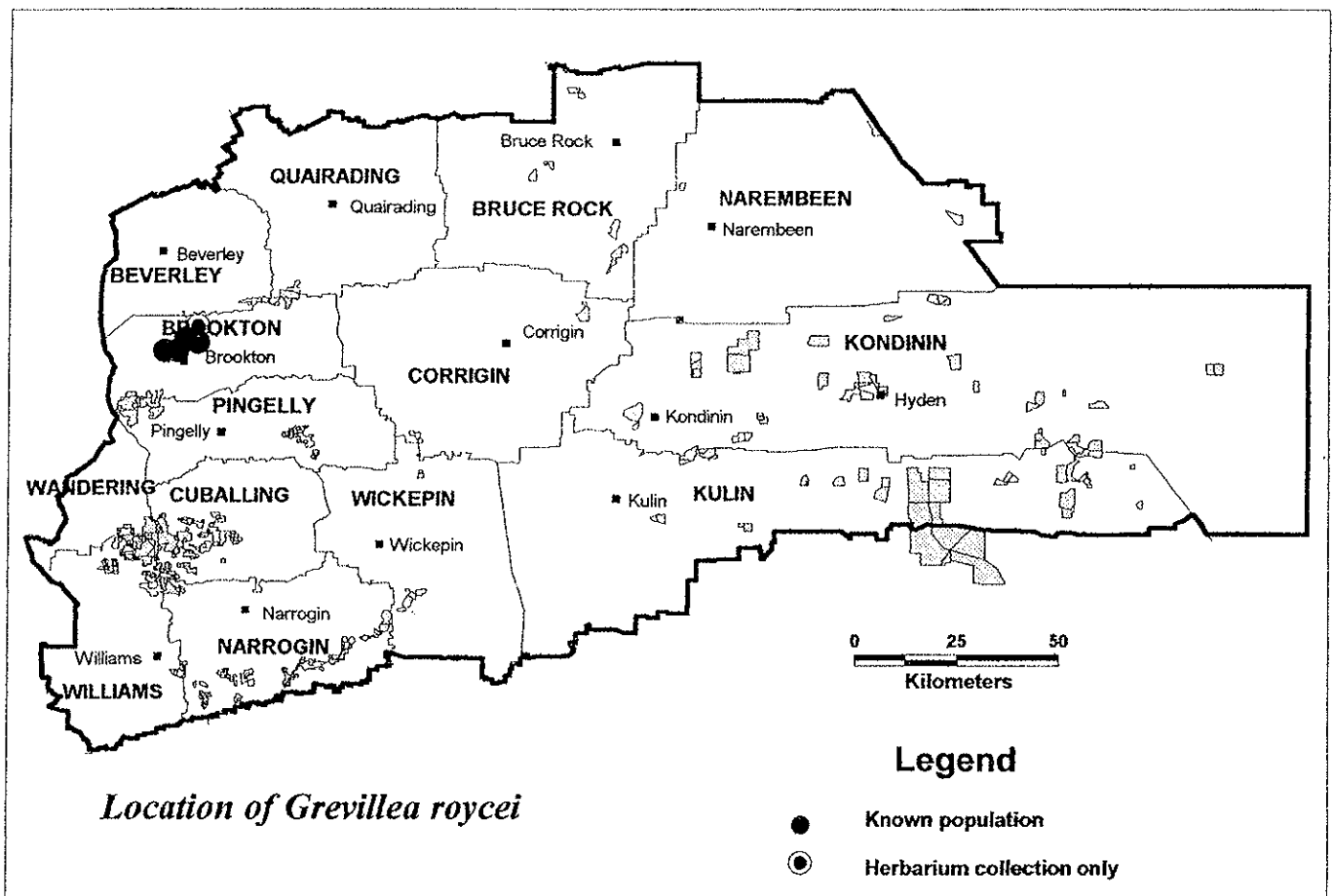
Management Requirements

- Monitor known populations occasionally.
- Ensure population 7 is protected during reserve management operations.
- Notify Westrail concerning population 5 and private landowners of population 6 and 8.
- Investigate the fencing of population 8 through the Remnant Vegetation Protection Scheme.

Research Requirements

- Survey for new populations on conservation reserves with deep yellow sand, within its known range.
- Research the response to disturbance for population enhancement.

References McGillivray (1993).



Grevillea wittweri McGillivray

PROTEACEAE

G. wittweri is a moderately dense spreading shrub, 0.9-2.2 metres high and up to 3 metres wide with many branches. The usually curled branchlets are angular to rounded and slightly ridged and covered with short hairs. The 4-8 cm long leaves are ascending, stalkless to sub-sessile. The 5-7.5 cm long, and up to 2 cm across terminal flower cluster is erect and simple. The perianth is greenish. The style is bright red. The 12-14 mm long, 7-8.5 mm wide, and 5-6.5 mm thick pedicels are curved. Styles are persistent and the fruit erect on the stalk.

Flowering period: September - November, sometimes January, March and April.

Distribution and Habitat in the Narrogin District

Known from the area of Dragon Rocks, Lake Cronin, Lake King and Lake Grace, occurs on sandplain and dunes in association with heath and mallee shrubland with *Eucalyptus*, *Acacia* and *Allocasuarina* species.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|----------------|-------------|-------|-------------|---------------|---------------|
| 2* Lake Cronin | 08/10/81 | Kon | NR | Common | Not relocated |
| 3 Lake Cronin | 05/11/93 | Kon | NR | Nil | Unknown. |
| 9 Dragon Rocks | 09/12/93 | Kul | NR | 1 | Unknown. |

Bro Shire of Brookton

Bru Shire of Bruce Rock

* population known only as Herbarium record

Response to Disturbance

Unknown. Although there may be a link between disturbance and regeneration.

Susceptibility to *Phytophthora* Dieback

Unknown.

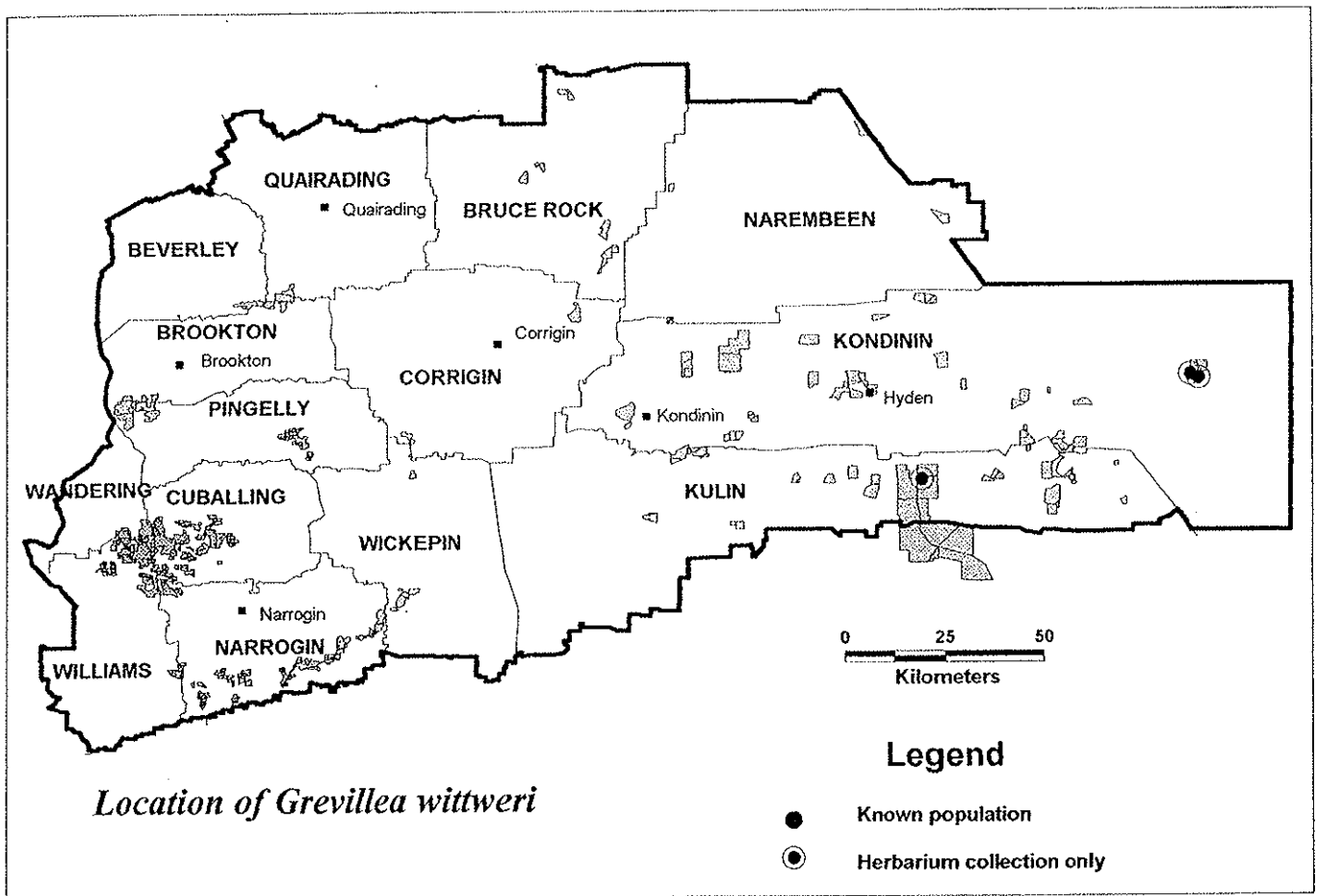
Management Requirements

- Monitor known populations occasionally.

Research Requirements

- Survey to relocate population number 1.
- Survey opportunistically, on Vacant Crown land and conservation reserves with similar habitat, east of Hyden.

References McGillivray (1993).



A mid dense, herbaceous annual of variable height, to 0.5 metres tall and 4-10 cm wide, with dark red- brown patches on the bracts. The bracts are 0.8 - 1.2 mm long usually without a nerve close to the keel on each side. The nut is red - brown to dark red- brown. This species is closely related to *I. congrua* and *I. victoriensis*. The bracts have more clearly defined ridges in *I. congrua* and *I. victoriensis*, and the spikelets are generally larger in *I. congrua*.

Flowering period: Unknown

Distribution and Habitat in the Narrogin District

Known to occur in inland regions of New South Wales, Victoria, Northern Territory, New Zealand and possibly South Australia. In Western Australia it has been collected from Lake Cronin and east of Coujinup Hill. It may be found on variable- drained, silty sand on moderately exposed, fresh lake margins, usually in *Melaleuca* thickets.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|----------------|-------------|-------|-------------|---------------|-----------|
| 1* Lake Cronin | 03/10/93 | Kon | NR | Frequent | Newbey |

Kon Shire of Kondinin
* population known only as Herbarium record

Response to Disturbance

Reported to regenerate following fire.

Susceptibility to *Phytophthora* Dieback

Unknown.

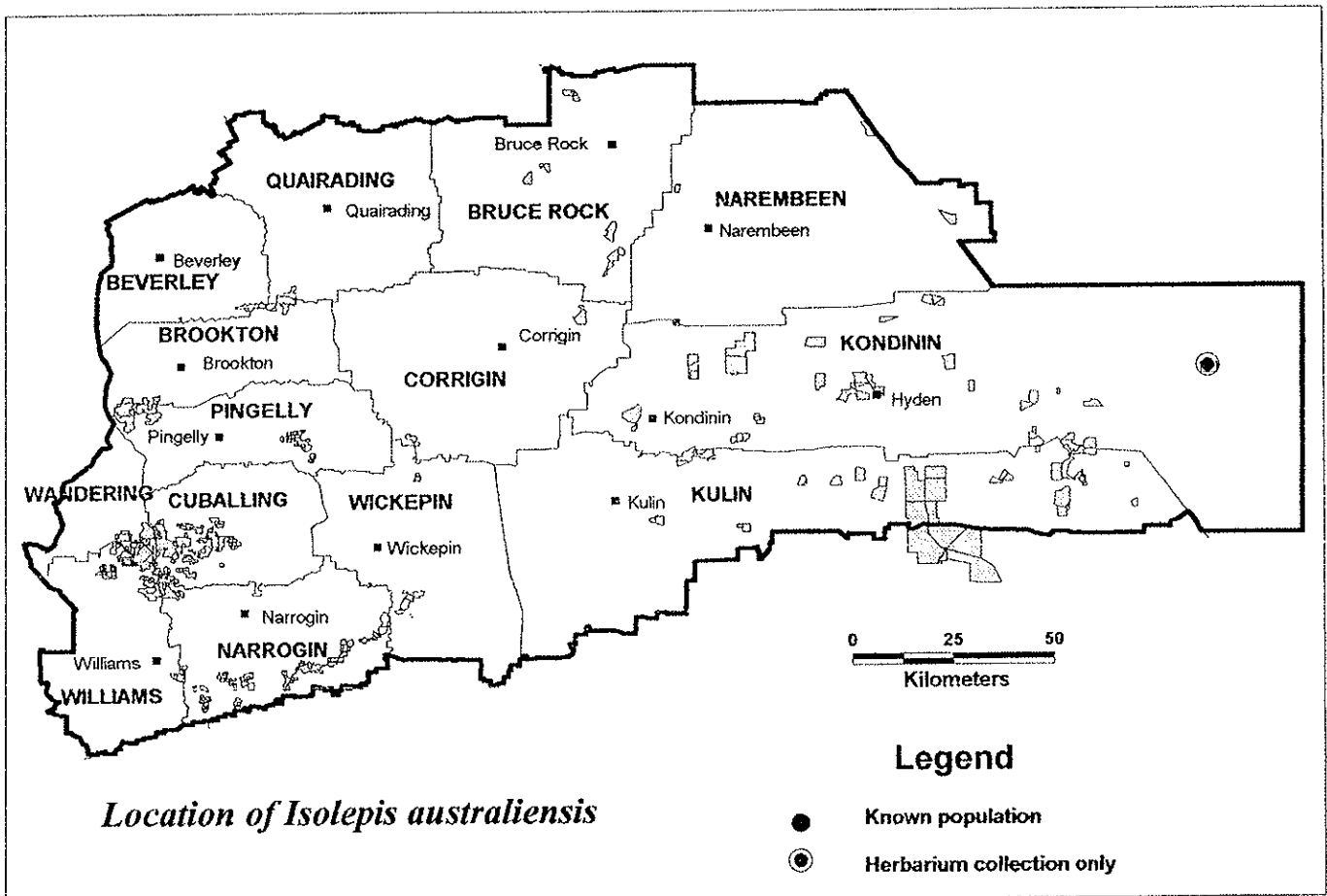
Management Requirements

- Ensure population location is protected during reserve maintenance operations.

Research Requirements

- Study Herbarium samples and survey to relocate known populations at Lake Cronin.
- Survey for new populations around similar fresh water lake margins in the Forrestania area.

References Wilson, (1981).



Lasioptalum cardiophyllum Paust

STERCULIACEAE

A slender, erect, multi stemmed shrub, up to 40 cm tall with pink flowers and hairy branchlets. The leaves are 9-26 mm long and 10 - 30 mm wide, entire, alternate, smooth and glabrous above, closely grey, hairy below, with a leathery texture. The leaf peduncle is 10 mm long. The hairy, 8 mm long calyx is pink, divided to the base into five narrowly oval shaped lobes gradually tapering to a sharp point. There are no petals. Almost sessile, 1.5 mm long anthers number five and are broadly oval to oblong shaped. The 1 mm long white hairy ovary is globular shaped with two ovules per locule. It has flowers similar to *L. floribundum* (Benth.) but is distinguished by having leaves with a leathery texture, broadly oval to heart shaped leaves which have a mat covering of star shaped hairs on the leaf undersurface. The species name refers to the heart shaped leaves.

Flowering period: August - January.

Distribution and Habitat in the Narrogin District

Occurs from near Boddington south eastwards to the Dongolocking area, south-east of Wickepin. Grows on red brown laterite over granite in association with shrubland in disturbed area adjacent to *Eucalyptus marginata*, *Trymalium ledifolium*, *Gastrolobium calycinus*, or wandoo over heath on gentle slopes in sandy clay over clay soils.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|-----------------|-------------|-------|-------------|---------------|-------------------|
| 1* Dongolocking | 24/08/85 | Wic | NR | Common | Keighery & Alford |

Wic Shire of Wickepin
* population known only as Herbarium record

Response to Disturbance

Responds favourably to disturbance. May respond to fire.

Susceptibility to *Phytophthora* Dieback

Unknown.

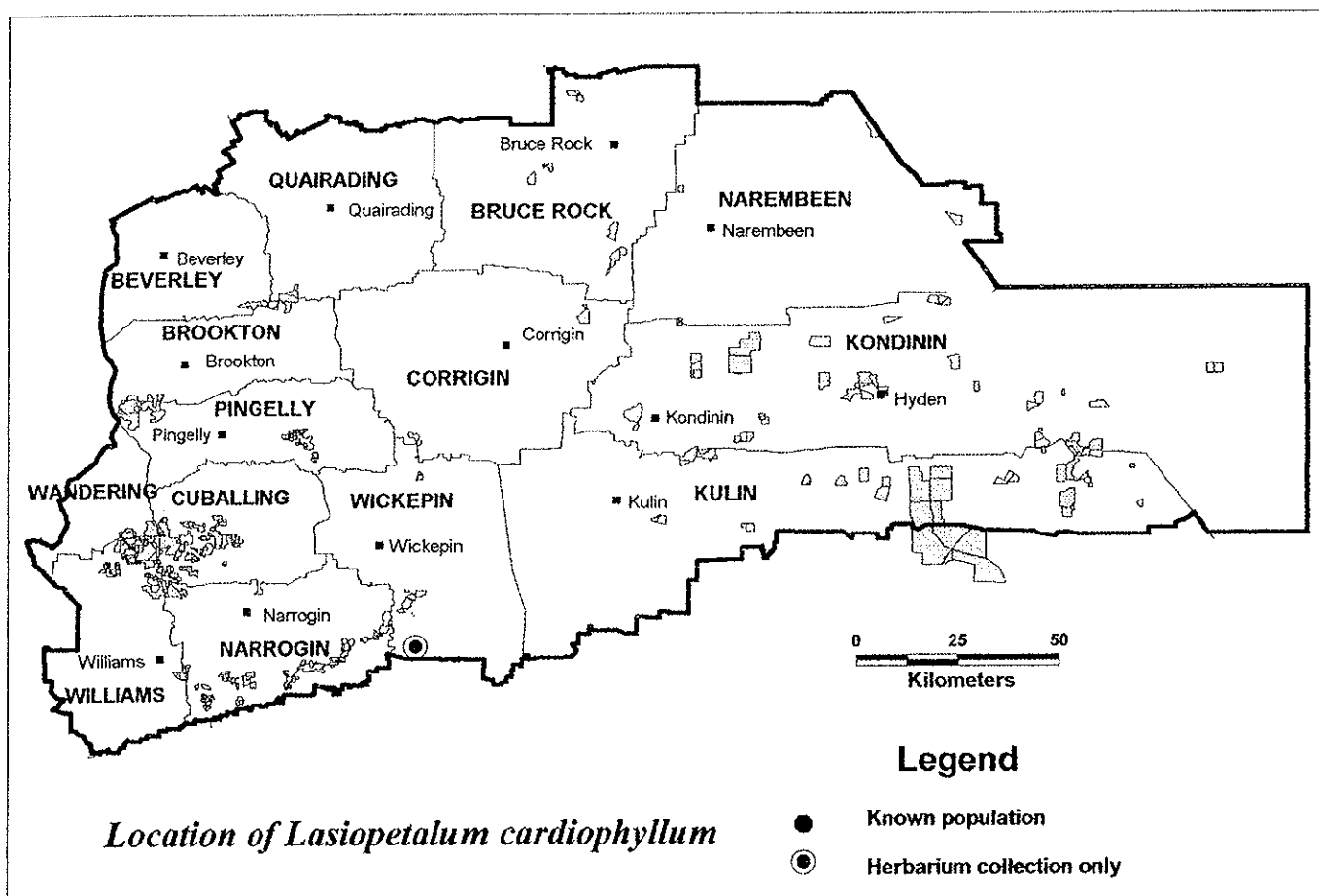
Management Requirements

- Nil until populations relocated.

Research Requirements

- Obtain location information from collectors and re survey known population in the District.
- Survey for new populations on adjacent conservation reserves. (It is likely to occur in conservation reserves in the western portion of the District. It may also occur in the Brookton rubbish tip reserve.

References Paust (1974).



Logania exilis Conn

LOGANIACEAE

L. exilis is a perennial almost leafless herb, about 40 cm tall with erect, slender, wiry-stems. The branches are 0.7-2 mm thick. The flowers are bunched around the nodes and have a faintly to mildly aromatic, musk-like fragrance. The tubular petals are fused for two-thirds of the length, white in colour with brown striations, The corolla is white, with lobes 3-5 mm long. The membranous margin of the calyx lobes is 0.1-0.2 mm wide.

Flowering period: September - March.

Distribution and Habitat in the Narrogin District

Occurs from east of Parker Range on the Mount Day Road, southwards to Mount Holland and Hatter Hill. It grows with heath and mallee scrub vegetation on yellow sandy loam and laterite.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-----------------|-------------|-------|-------------|---------------|-----------|
| 3* Hatter Hill | 02/10/76 | Kon | ? | Common | Unknown. |
| 4* Rabbit Fence | 09/1929 | Kon | RVS | ? | Unknown. |

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

May respond to mechanical disturbance, since most collections have been found on graded tracks.

Susceptibility to *Phytophthora* Dieback

Unknown.

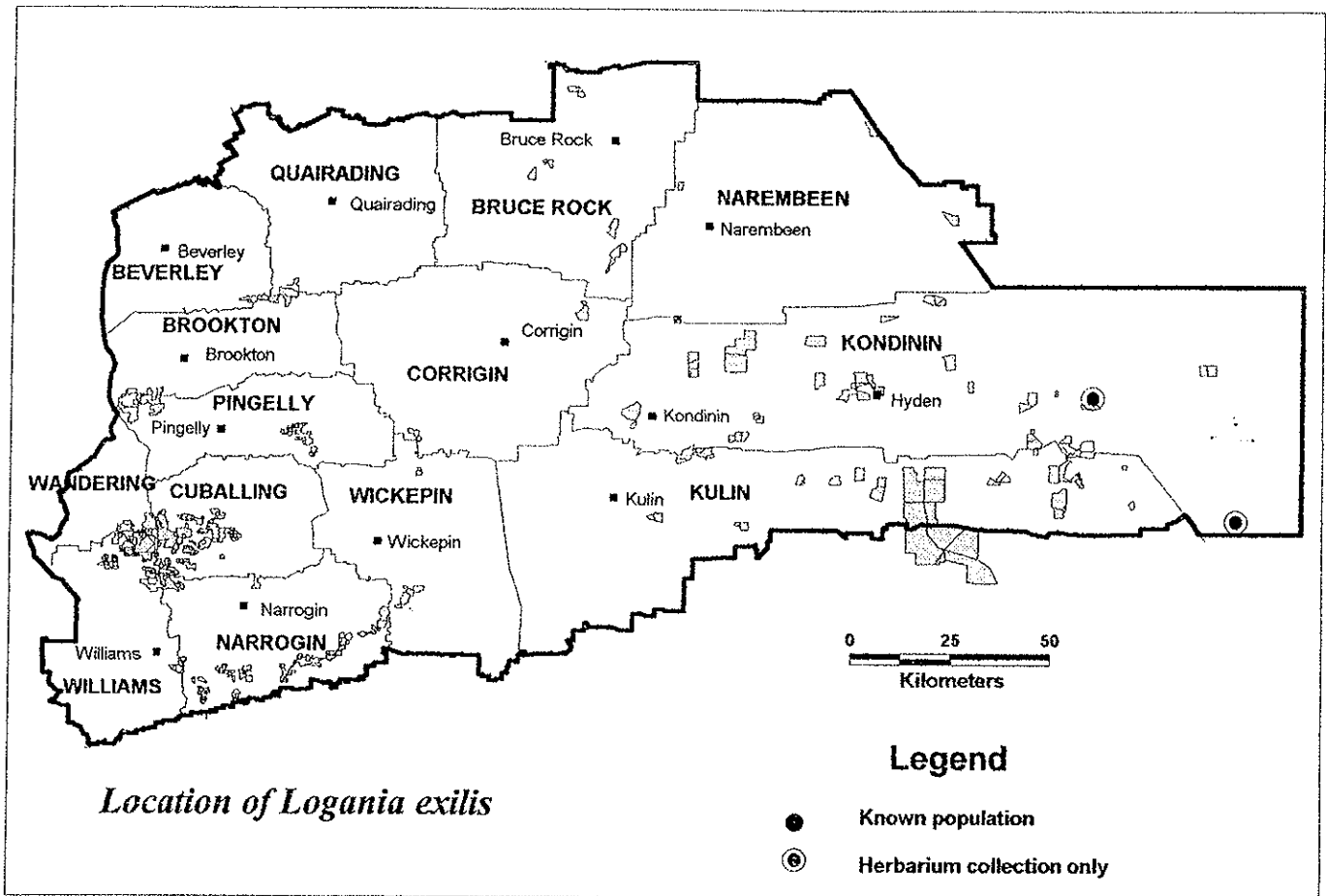
Management Requirements

– Nil until populations located.

Research Requirements

- Survey to relocate populations. Check disturbed areas such as grader tracks or survey lines in sand and laterite in the Ironcaps area.

References Conn (1994), Blackall & Grieve (1981).



Loxocarya eludens Johnson & Briggs ms.

RESTIONACEAE

L. eludens ms. is a rush-like, leafless, wiry, tortuous, small, straggling, understorey plant. It grows in circular wiry looking patches of small tufts up to 20 cm tall and 30 cm in diameter, or as rings with bare centres up to 50 cm. There are both male and female plants.

Flowering period: October - November.

Distribution and Habitat in the Narrogin District

Known only from the Narrogin District. It is recorded from south east of Kulin, Flat Rocks, and Dragon Rocks Nature Reserve. It grows in pale yellowish sand with some gravel, light brown sandy loam and white sand with gravel below laterite, in open shrubland or heath with *Allocasuarina humilis*, *Banksia sphaerocarpa*, *Acacia*, and *Beaufortia* species.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|----------------|-------------|-------|-------------|---------------|-----------|
| 1 Hopkins | 01/11/88 | Kul | NR | 200 | Healthy |
| 2 Flat Rock | 08/10/93 | Kul | NR | Common | Healthy |
| 3 Dragon Rocks | 03/11/93 | Kul | NR | Scattered | Healthy |
| 4 Dragon Rocks | 09/12/93 | Kul | NR | Scattered | Healthy |
| 5 Dragon Rocks | 09/12/93 | Kul | NR | Scattered | Healthy |

Bro Shire of Brookton

Bru Shire of Bruce Rock

* population known only as Herbarium record

Response to Disturbance

Unknown, although the plant appears to be long lived and persists as an understorey plant.

Susceptibility to *Phytophthora* Dieback

Unknown.

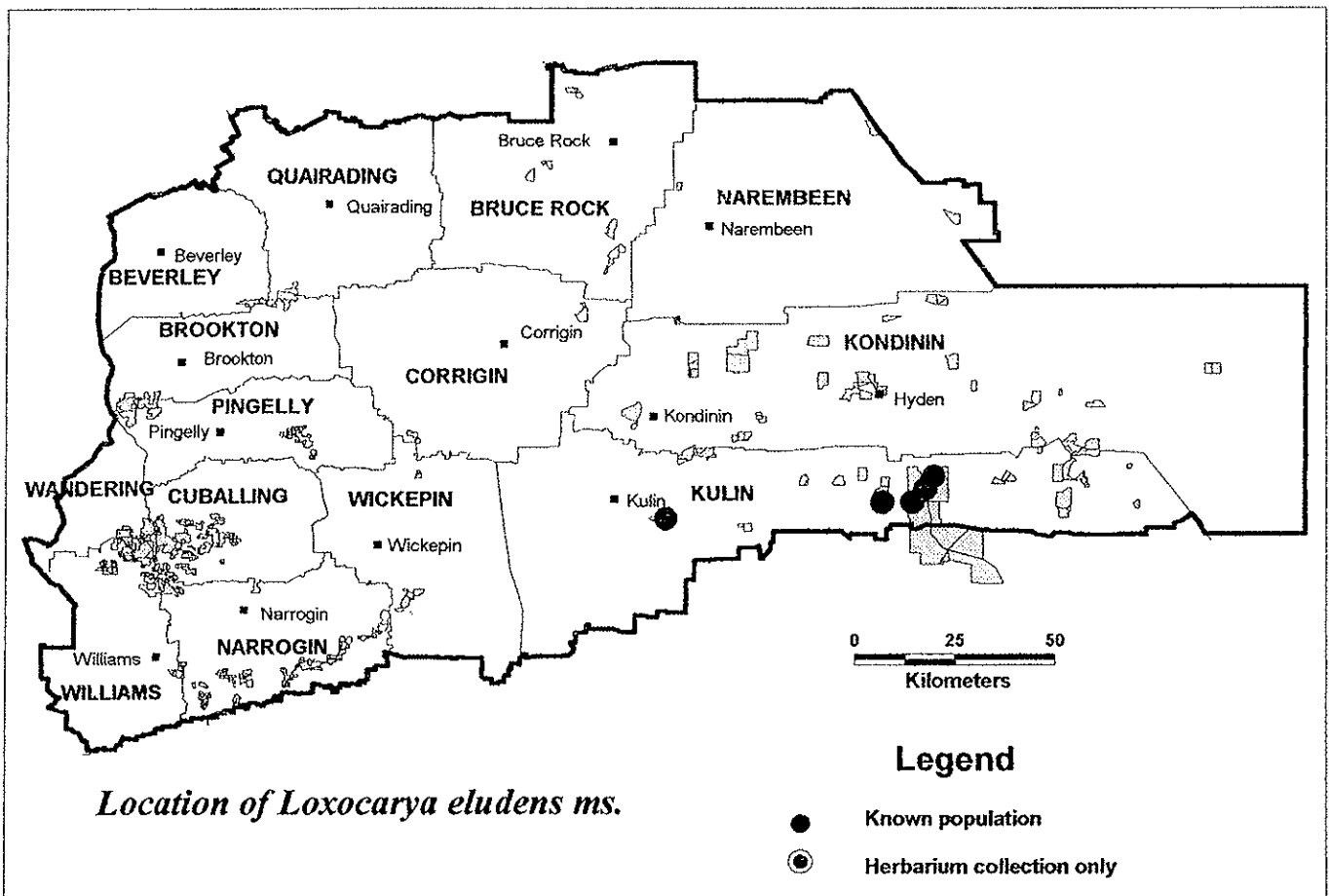
Management Requirements

- Monitor known populations occasionally.
- Ensure populations are protected during reserve management operations.

Research Requirements

- Survey opportunistically.

References Briggs. & Leigh. (1988)



Microcorys tenuifolia Bentham

LAMIACEAE

A member of the mint family, *M. tenuifolia* is a slender, low sprawling, fairly dense dwarf shrub up to 60 cm high. The branches and young shoots are densely covered with whitish hairs. The leaves are opposite, narrow with slightly recurved margins, mostly 12-18 mm wide, to 2.4 cm long. The calyx is narrow, covered with minute hairs. The corolla is hairy and 3-lobed. The Flowers are white and brown, pink and mauve. The species name refers to the thin, narrow, delicate leaf.

Flowering period: October - December.

Distribution and Habitat in the Narrogin District

M. tenuifolia is a widespread occurring plant, with a 350 kilometre range, from north of Northampton to the Dongolocking Nature Reserve, south east of Wickepin. It may favour colluvium soils and in the Narrogin District it occurs in heath of *Dryandra armata*, *Melaleuca pungens* and *Hakea* sp.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-----------------|-------------|-------|-------------|---------------|-------------------------|
| 5* Dongolocking | 08/12/93 | Wic | NR | ? | Unknown.- Not relocated |

Wic Shire of Wickepin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

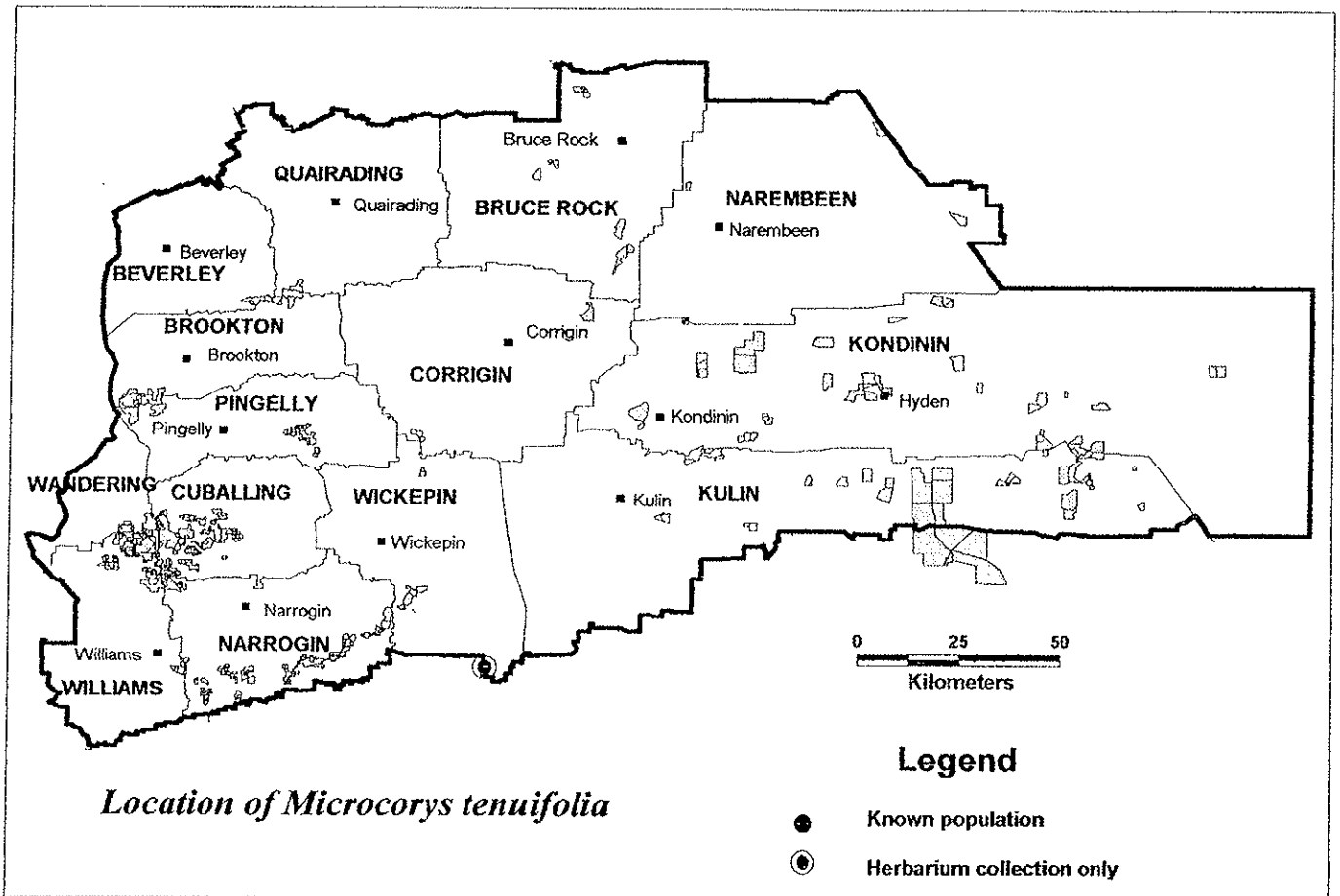
Management Requirements

– Nil until populations found.

Research Requirements

- Survey for population number 5 and new populations within the Dongolocking area.

References Bentham (1870).



Millotia pilosa Short

ASTERACEAE

An annual herb with simple or branching stems, the major axes to about 8 cm long, ascending to erect, with a covering of white cottony hairs. The leaves are all linear and erect about 1-15 mm long and 0.1 - 0.6 mm wide. The lower most leaves are in opposite pairs, while the uppermost leaves are alternate. Florets number 5 - 29. The 2.5 - 4.6 mm long corolla is tubular in shape, pale cream at anthesis but drying yellow and sometimes partly purplish. Lobes number 5 and are 0.25 - 0.5 mm long, the outer surface of the corolla tube is covered with scattered, stalked glandular hairs. The species name refers to the hairy covering on the involucre bracts. It is similar to *M. eichleri*, *M. newbeyi* and *M. tenuiflora*. It differs from these species in having stalked glandular hairs, at least some of which are 1-2 mm long, on the involucre bracts.

Flowering period: August- September.

Distribution and Habitat in the Narrogin District

May be found growing on granite rock outcrops on moss swards. It is only known from the type collection population from Mount Stirling Nature Reserve.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|----------------------------|-------------|-------|-------------|---------------|-----------|
| 1* South of Mount Stirling | 26/08/85 | Qua | ? | ? | Wilson |
| 2* Mount Stirling | 25/09/93 | Qua | NR | ? | Short |

Qua Shire of Quairading
* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

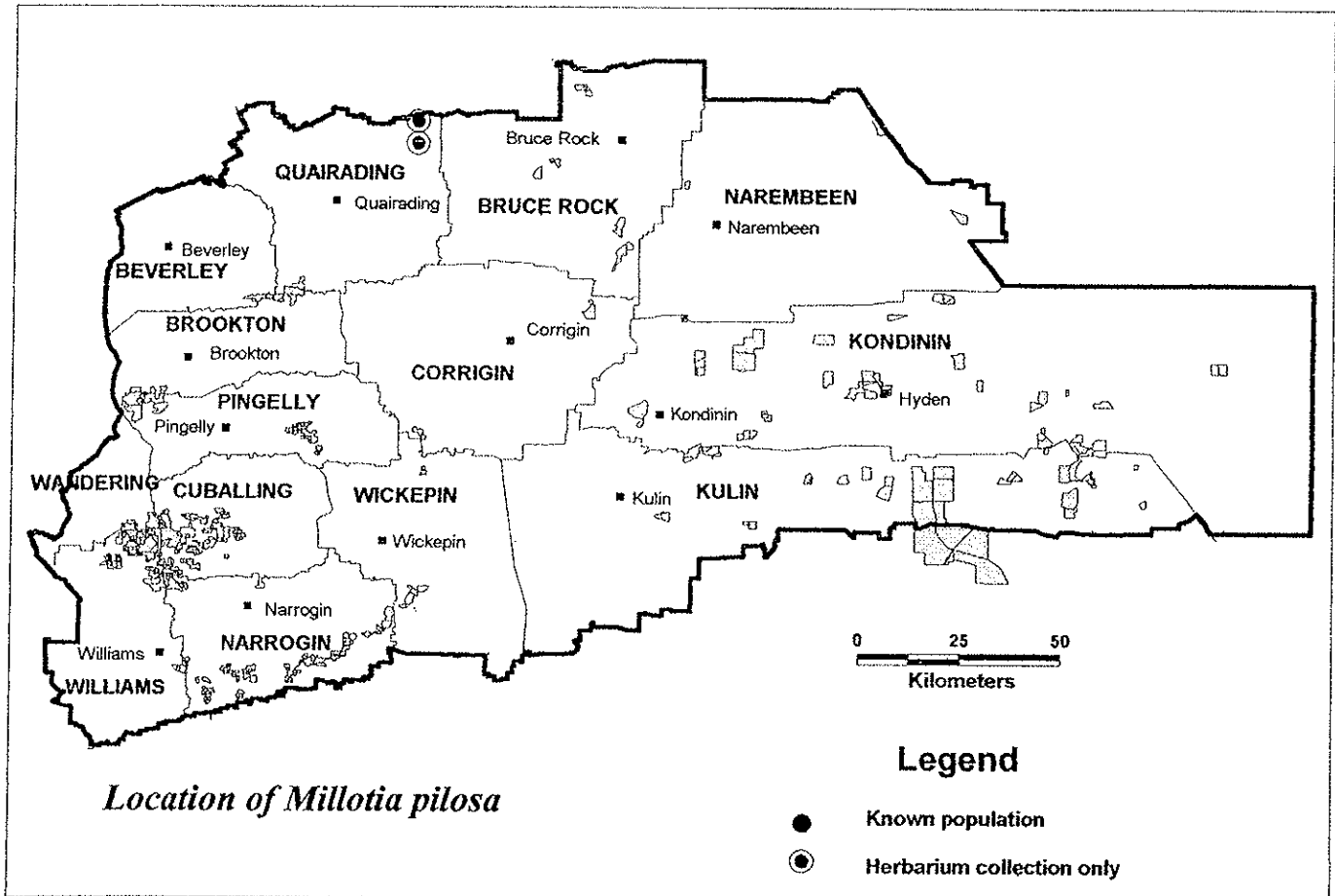
Management Requirements

- Nil until populations relocated.
- Ensure collection location is protected during reserve management operations.

Research Requirements

- Obtain location information from collectors and re-survey area to relocate population.
- Survey for new populations on adjacent conservation reserves, especially the remaining granite rock Nature Reserves in the vicinity of Mount Stirling.

References Short (1995).



Neofuscelia kondininensis Elix

PARMELIACEAE

A rare lichen, 4 - 5 cm wide with the main body of the plant being leafy and tightly fused. The 0.5 - 1.5 mm wide, flat lobes barely overlap and are nearly linear to elongate in shape. The upper surface is yellowish brown to dark brown, dull or slightly shiny and smooth at the margins. The lower surface is ivory to pale brown in colour, often darker at the apices. It may be characterised by the tightly fused plant main body, the lobes with an ivory to pale brown lower surface. *N. incantata* is similar, but differs in the colour of the lower surface where the underside is dark brown or black, but often paler at the lobe apices.

Distribution and Habitat in the Narrogin District

Known from only one locality east of Kondinin on the road to Hyden. It may be found growing on rock.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|-------------------|-------------|-------|-------------|---------------|----------------|
| 1=* Kondinin east | 19/08/87 | Kon | ?NR | Unknown. | Elix & Sargent |

Kon Shire of Kondinin
=* population not stored in WA Herbarium records.

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

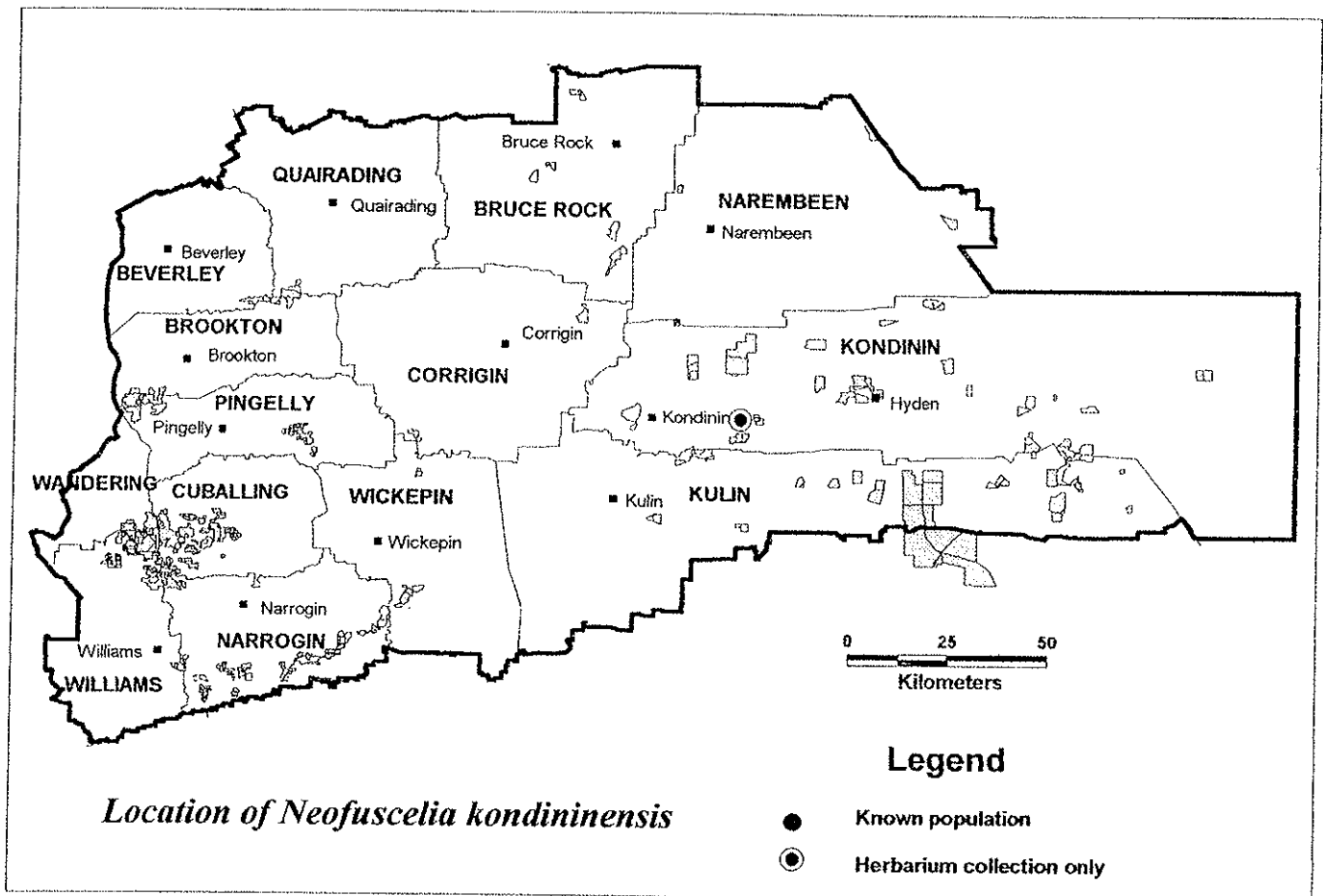
Management Requirements

-- Nil until populations relocated.

Research Requirements

- Obtain original collection information concerning the location of population number 1.
- When relocated, determine the need to re-survey the population.

References Elix (1993).



Persoonia hakeiformis Meissner

PROTEACEAE

A small, many branched spreading shrub up to 1.2 metres tall and 1.3 metres wide. The leaves are shaped like a bow, the leaf margins are revolute making the leaf cylindrical. The younger shoots are covered with greyish hairs. The flowers are yellow. The perianth bright yellow. The species name relates to having the form and shape of the *Hakea* genus.

Flowering period: November - December

Distribution and Habitat in the Narrogin District

P. hakeiformis is known from south of Moora to Kukerin and eastwards to Dragon Rocks Nature Reserve. In the Narrogin District it is found to inhabit laterite and sandy loam over laterite soil types. In Dryandra, its habitat is open low *Eucalyptus accedens* woodland, with low *Banksia sphaerocarpa*, *Beaufortia* sp. and *Leptospermum* sp. and scrub.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|----------------|-------------|-------|-------------|---------------|-----------|
| 2 Dryandra | 07/10/92 | Wil | SF | 2 | Fair |
| 5* Tutanning | 19/11/85 | Pin | NR | ? | Unknown. |
| 6* Boyagin | 19/11/80 | Pin | NR | ? | Unknown. |
| 7 Dragon Rocks | 09/12/93 | Kul | NR | 1 | Good |

Wil Shire of Williams

Pin Shire of Pingelly

Kul Shire of Kulin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

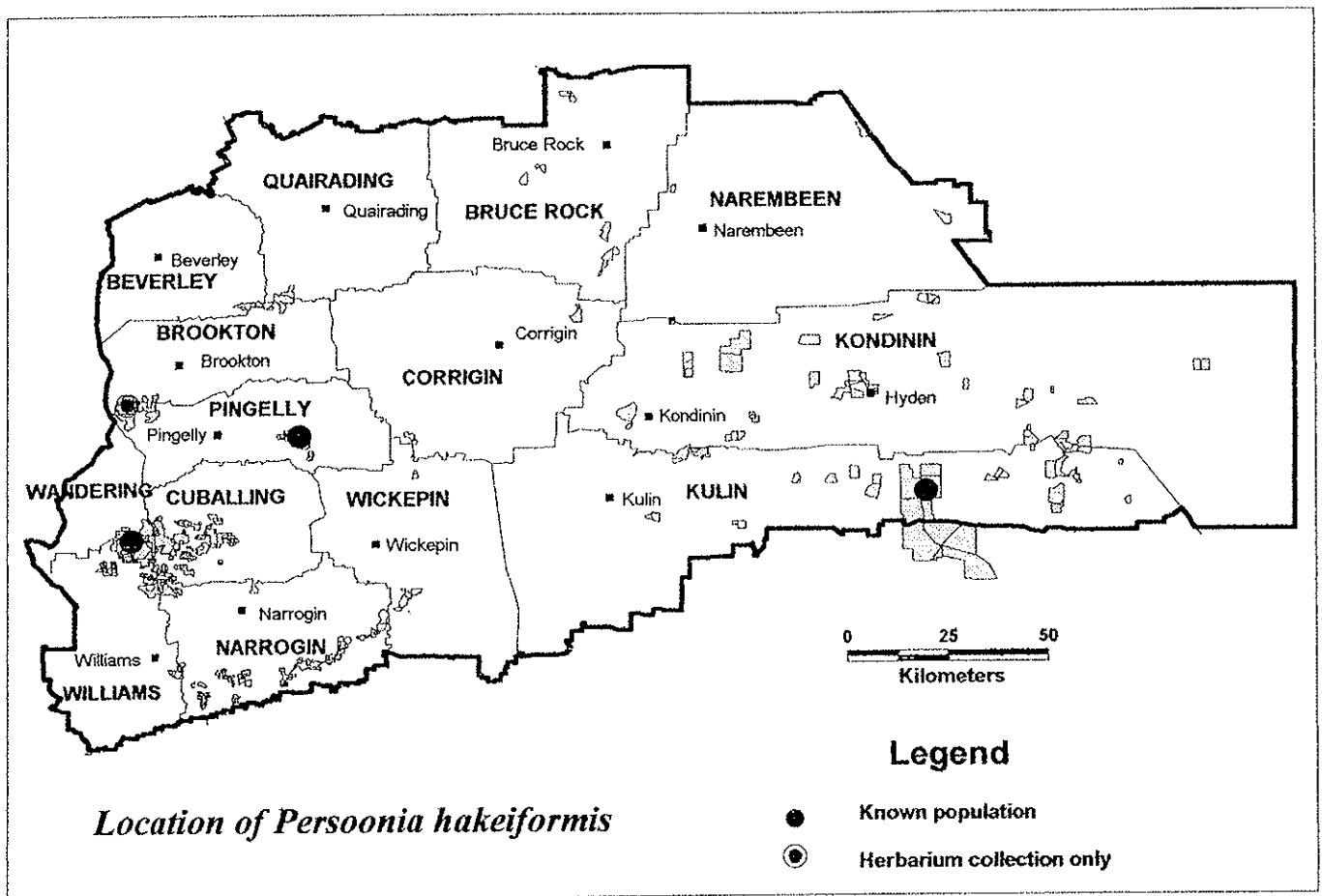
Management Requirements

- Monitor known populations occasionally.
- Ensure all known populations are protected during management operations.

Research Requirements

- Survey to locate population number 5 and 6.
- Survey for new populations. It is widely distributed and there are many conservation reserves in the Narrogin District with similar habitat.

References Meissner (1856).



Petrophile crispata R.Br.

PROTEACEAE

P. crispata is an upright open shrub to 60 cm high and 100 cm wide. The leaves are cylindrical, stiff, sharply pointed and divided 2 or 3 times. The flower heads are egg shaped, stalkless, yellow in colour about 2 cm long. The perianth has shaggy hairs. The outer bracts are sticky and deciduous. The cone scales are broad at the base and have woolly hair. The tips of the scales are short and hairless.

This species may possibly be a variety of *P. rigida*, although the inflorescence are smaller and the perianth is less hairy. The leaves are also longer and not as rigid.

Flowering period: September - October.

Distribution and Habitat in the Narrogin District

Only two populations are recorded in the Narrogin District. The species is mainly distributed from near Katanning to Albany and eastwards to the Fitzgerald River National Park. It occurs in association with other Proteaceae, Myrtaceae and Isopogon sp. in open woodland to shrubland and heath, on laterite and laterite ridges.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|---------------|-------------|-------|-------------|---------------|-----------|
| 6* Dale River | 10/1943 | Bev | ? | ? | Unknown. |
| 7 Boundain | 10/02/94 | Nar | TBR | ? | Unknown. |

Bev Shire of Beverley

Bru Shire of Narrogin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Presumed susceptible.

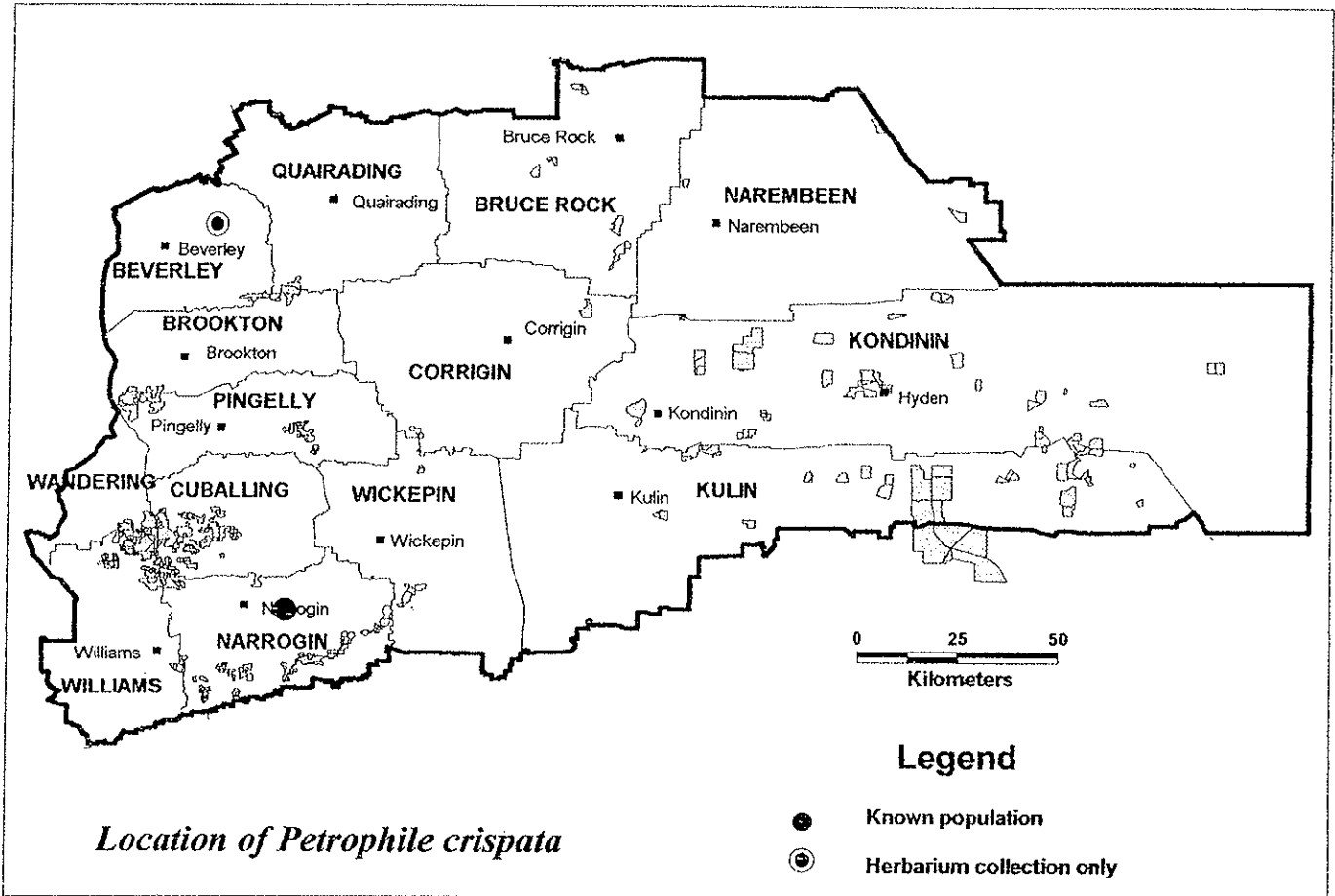
Management Requirements

- Re-locate population 7 and confirm numbers.

Research Requirements

- Confirm taxonomy of this species.

References Brown (1830), Sainsbury (1987)/



Phyllota gracilis Turcz.

PAPILIONACEAE

P. gracilis is a domed and much branched shrub, to 40 cm tall and 50 cm wide. The stems are cylindrical covered with short white hairs which are dense on the upper parts. The leaves are minute, elongate, 1-3 mm long with scattered hairs and the leaf margins turned back, bearing a deciduous black spine. The stipules are minute. The solitary flowers are tiny, yellow and red, occurring near the end of the branches. The pedicel is 4 mm long. The bracts look like leaves. The calyx is 3 mm long and densely covered with pale yellow hairs.

The species name is derived from the Latin meaning thin or slender.

Flowering period: December.

Distribution and Habitat in the Narrogin District

P. gracilis has been collected from around Narrogin. It has also been collected from Arthur River, Collie, Jandakot, and Mundaring. It favours depressions and sand rises on swamp margins and may grow in tall, open *Eucalyptus marginata* woodland. Geologically, *P. gracilis* appears to favour lowland formations such as alluvium and lake deposits.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-------------|-------------|-------|-------------|---------------|-----------|
| 2* Narrogin | 02/1959 | Nar | ? | ? | Unknown. |
| 3* Narrogin | 1845 | Nar | ? | ? | Unknown. |

Nar Shire of Narrogin
* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

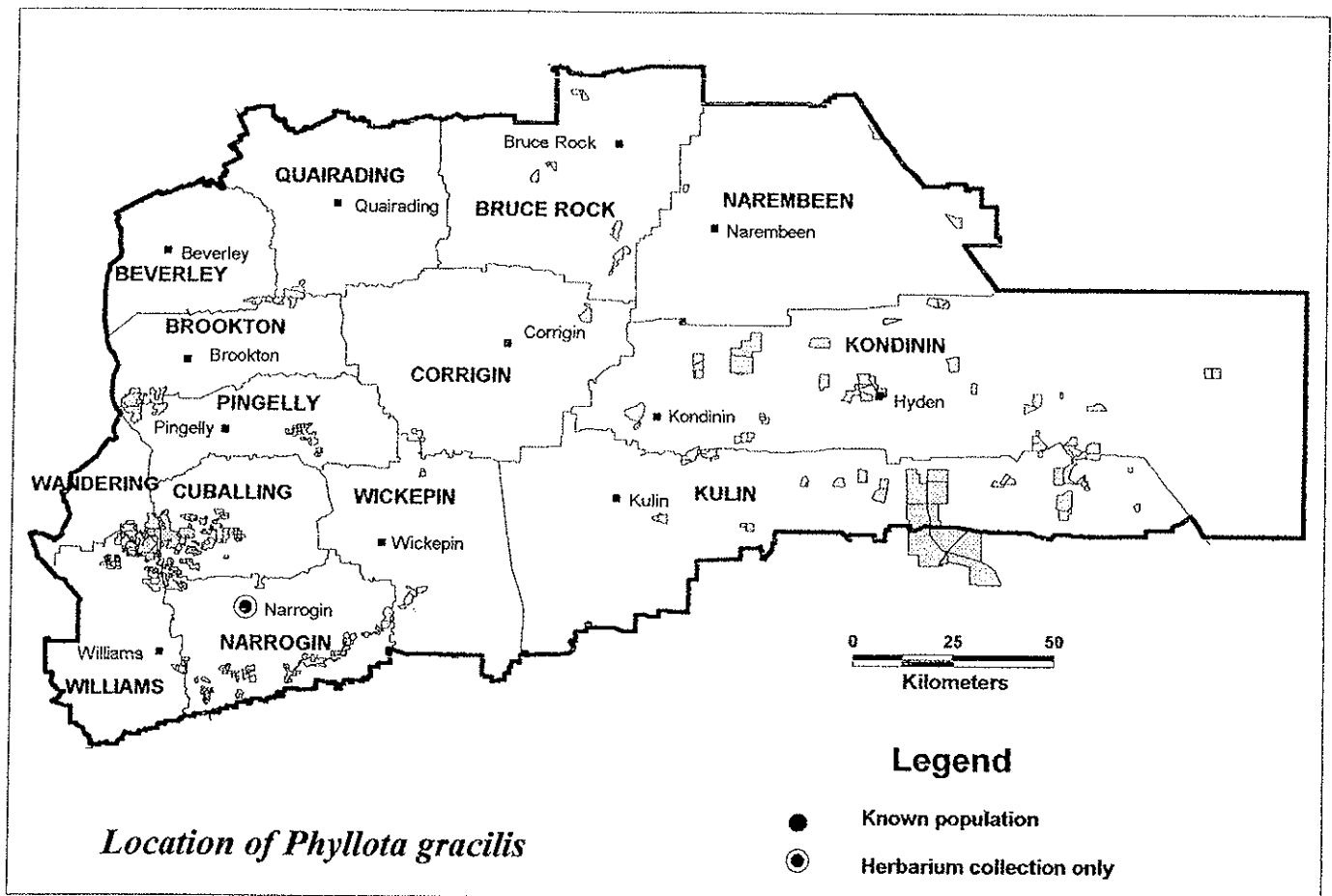
Management Requirements

- Nil.

Research Requirements

- Survey for new populations on similar soil types within its known range.

References Turczaninow (1853) Jancey (1966).



Podotheca pritzelii Short

ASTERACEAE

P. pritzelii is an annual herb to 10 cm tall with the major axes of the plant ascending or erect. The leaves are 3.5 cm long and 0.1-0.25 cm wide, linear or lance-shaped, succulent, pale-green or purplish in colour with flat, apparently divided hairs. The flowers are yellow to yellow-orange, with 19-73 flowers per plant. The corolla tube is 14-19 mm long and stamens number 5.

Flowering period: October.

Distribution and Habitat in the Narrogin District

Known from near Wongan Hills to north of Quairading and Nangeen Hill. In the Narrogin District, *P. pritzelii* inhabits the top of sand dunes that occur around playa lakes. It is associated with samphire and *Melaleuca* vegetation.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|----------------|-------------|-------|-------------|---------------|---------------|
| 3* Salt River | 04/10/94 | Qua | NR | Nil | Not relocated |
| 6 Nangeen Hill | 05/10/94 | Bru | PP | Abundant | Healthy |
| 7 Kwolyin Hill | 05/10/94 | Bru | NR | Scattered | Healthy |

Qua Shire of Quairading

Bru Shire of Bruce Rock

* population known only as Herbarium record

Response to Disturbance

Although *P. pritzelii* grows near salt lakes, it appears not to be affected by salinity, possibly because it grows on sand ridges above the salt environment.

Susceptibility to *Phytophthora* Dieback

Unknown.

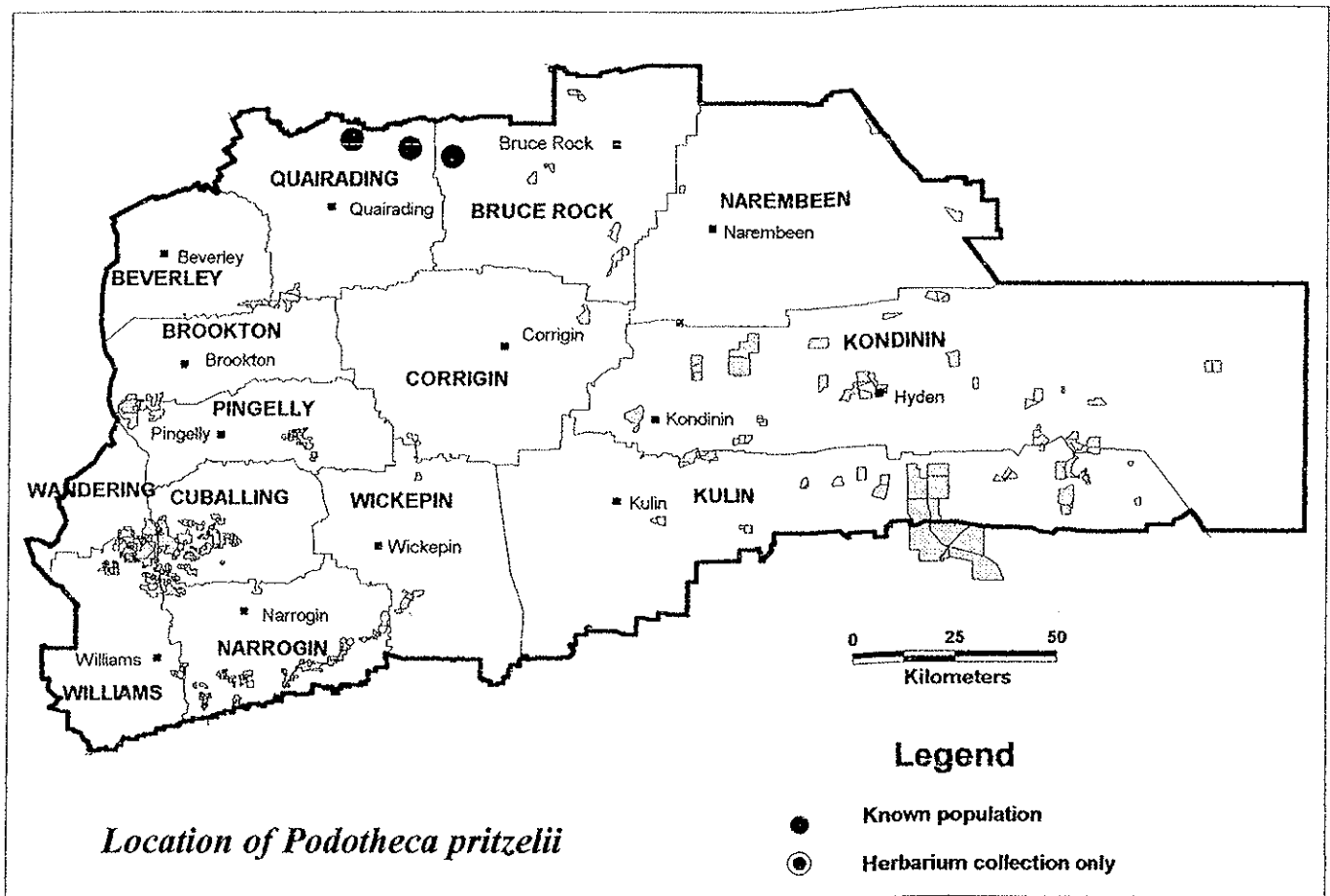
Management Requirements

– Monitor populations occasionally.

Research Requirements

- Survey to relocate population 3 and survey for new populations on conservation reserves. The dunes, which are associated with many shallow, ephemeral salt lakes of the area, are frequently to the east or south east of the drainage lines. Population 3, Salt River Reserve, should be surveyed for on the eastern side.

References Short (1989).



Stylidium coatesianum Lowrie & Carlquist

STYLIDIACEAE

A perennial flowering herb growing in tufts. The leaves are 1.0-3.5 cm long and 2 mm wide, occur in a basal rosette and are covered densely with hairs on both surfaces. The leaves have a narrow end towards the base or are long with parallel edges. The leaf margins are incurved with a leathery texture. The flower cluster occurs in a raceme, glabrous below, upper portions sparsely hairy. The pedicels have short glandular hairs, the margin of the bracts is thin. The 2.5 mm long egg-shaped ovary is hairless. Corolla yellow, corolla lobes oblong, with rounded tips, lobes 3.0-3.5 mm long. Throat appendages 4, with brown rounded tips.

S. coatesianum is distinguished by the blunt tipped leaves having an upward curved margin, which may be long with parallel edges or have their narrow end towards the base. In addition, the calyx lobes have their narrow ends attached and translucent margins. Flowers are yellow, stained wine-red.

Flowering period: November.

Distribution and Habitat in the Narrogin District

Known from one population in the Tutanning Nature Reserve east of Pingelly, growing on a ridge in laterite soil.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|--------------|-------------|-------|-------------|---------------|-----------|
| 1* Tutanning | 07/11/89 | Pin | NR | ? | Lowrie |

Pin Shire of Pingelly
* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

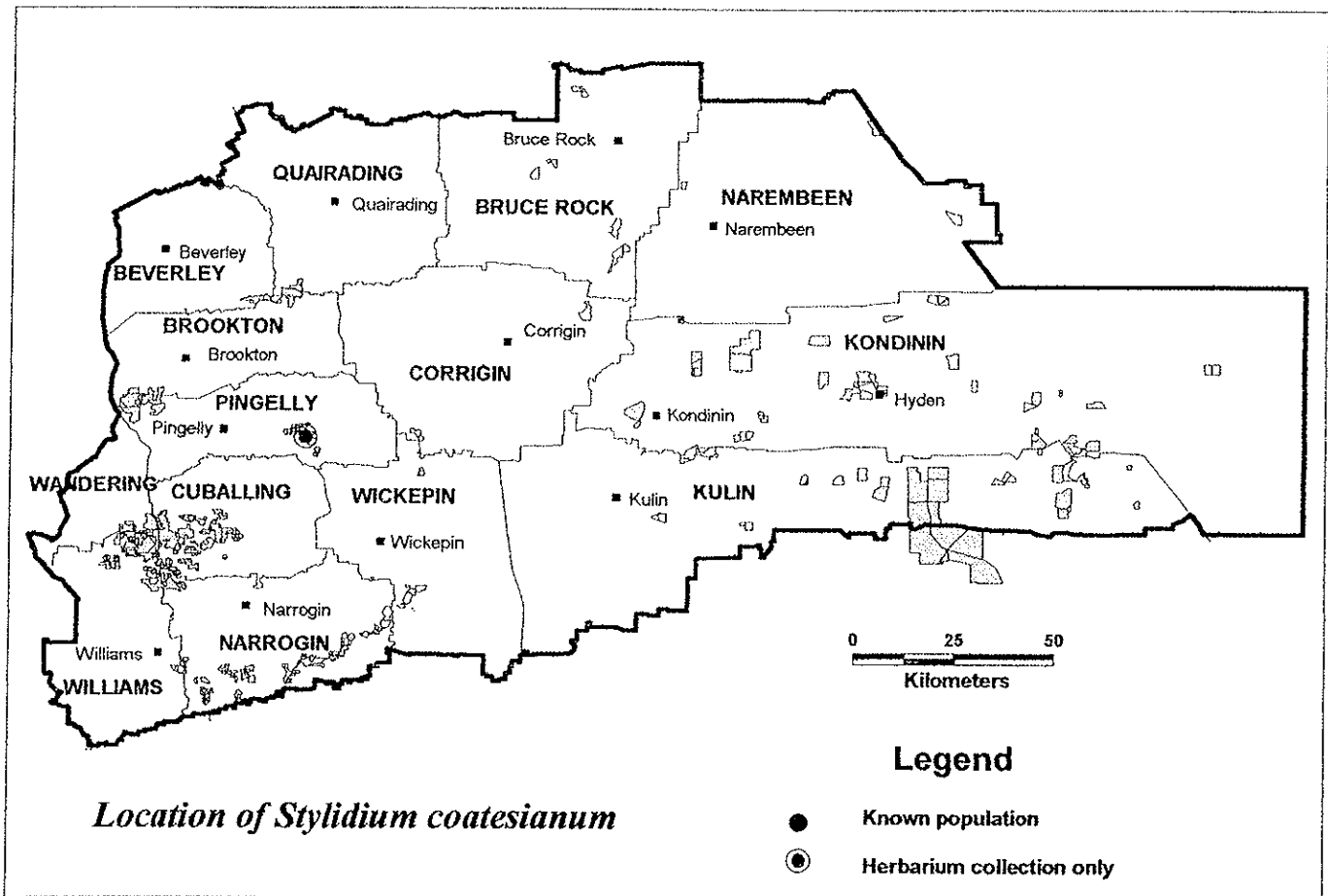
Management Requirements

- Protect the location of population 1 during reserve management operations.

Research Requirements

- Survey to relocate population 1 at the Tutanning Nature Reserve. The habitat of *S. coatesianum* is described as "laterite soil on top of mesa". This laterite is probably associated with a large dyke entering the reserve.
- Survey the Tutanning Nature Reserve Annex. This has two large dykes that intersect. Other conservation reserves that may have suitable dyke habitat are Pingeculling, Weam, Boyagin Rock and Dryandra State Forest.

References Lowrie & Carlquist (1991).



Thysanotus brachyantherus Brittan

ANTHERICACEAE

A perennial fringed lily flowering herb. The rootstock is small with clustered fibrous roots. The leaves are hairless, up to 15 cm long and are withered usually before flowering. There are 1 and sometimes 2 flower clusters per plant. The leafless, cylindrical and hairless flower stalk is surrounded by 4-5 membranes arising from basal leaves. Triangular bracts which are 5-12 mm long occur at the lowest branch. There are 1-4 usually terminal flowers on branches or branchlets occasionally without a stalk. There are 6 stamens, the 3 outer anthers slightly curved, slightly twisted, the 3 inner anthers slightly curved and markedly twisted. In comparison with the anthers of *T. cymosus*, the three inner anthers of *T. brachyantherus* are short and markedly twisted. The species name refers to the short anthers.

Flowering period: September - December.

Distribution and Habitat in the Narrogin District

Occurs from 140 kilometres north west of Kalgoorlie, southwards to Norseman, Salmon Gums. and east to Mount Heywood and Mount Ragged. Recently, an outlying population has been found at Karlgarin Hill in the Narrogin District. The habitat varies. It is reported near the Gilgi holes in brown clay; in a moderately drained and slightly saline loam, a well drained calcareous loam and on sand plain. At Karlgarin Hill it occurs amongst granite in colluvium loam at the base of granite rocks.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|------------------|-------------|-------|-------------|---------------|----------------|
| 6 Karlgarin Hill | 10/12/93 | Kon | NR | Common | Grass invasion |

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

At the base of the rock at Karlgarin Hill agricultural grasses are common. However, the plant is quite common and seems to compete well with grass species.

Susceptibility to *Phytophthora* Dieback

Unknown.

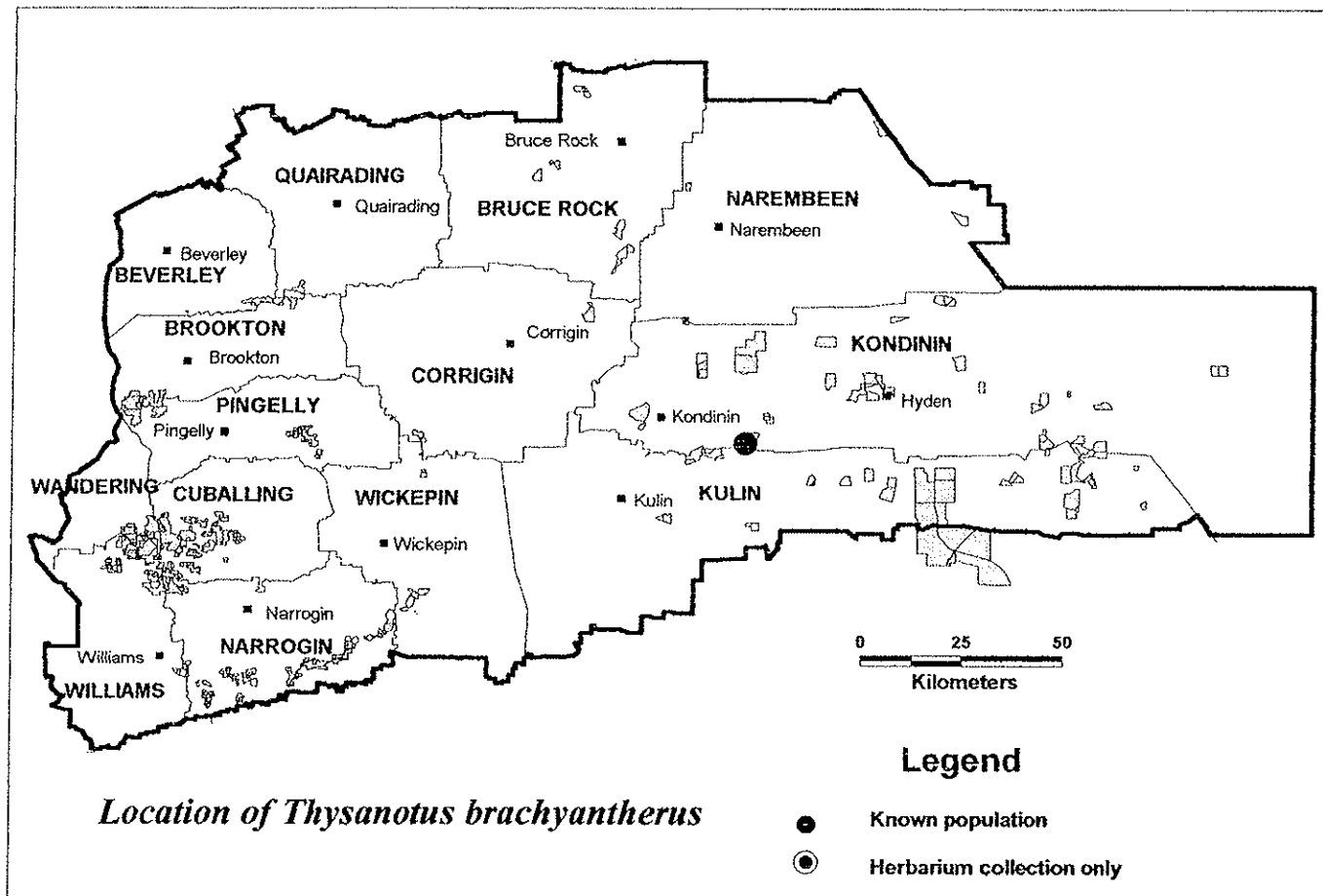
Management Requirements

- Monitor population 6 and confirm location and numbers. Protect population during reserve management operations.

Research Requirements

- Study the effect of grass species and competition.
- Survey opportunistically on conservation reserves at the base of granite outcrops.

References Brittan (1972).



Thysanotus cymosus Brittan

ANTHERICACEAE

A perennial herb with a fringed lily flower with two or three 20-30 cm long, cylindrical, hairless leaves, and fibrous roots. The flower stock is surrounded by old leaf sheaths. The 25 cm tall and 10 mm wide leafless flower stalk arises from basal leaves with 4-6 flowers emanating from the same point on the stalk. The perianth is linear to 1 cm long. There are 6 stamens, the anthers unequal, straight not twisted. The 3 outer anthers are 3 mm long, the 3 inner 4.5 mm long. The ovary is sessile. The species name refers to the flower-head in which the central axis stops growing on the production of a flower and subsequent flowers grow on lower stalks. The oldest flower is at the centre.

Flowering period: September - November.

Distribution and Habitat in the Narrogin District

The species occurs over 240 kilometres from Muntadgin in the north of the District, southwards to Ongerup. In some locations *T. cymosus* appears to occur below granite rock outcrops and elsewhere on sandy gravel sandplain in association with heath vegetation.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|-------------------|-------------|-------|-------------|---------------|-----------|
| * Muntadgin | 9/1947 | Nar? | RVS? | ? | Bailey |
| * E of Hyden? | 01/11/73 | Kon | ? | ? | Brittan |
| * Karlgarin Hill? | 01/11/73 | Kon | NR? | ? | Brittan |

Nar Shire of Narembeen

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

At Karlgarin Hill, the 1973 collection site, is now infested with agricultural grasses.

Susceptibility to *Phytophthora* Dieback

Unknown.

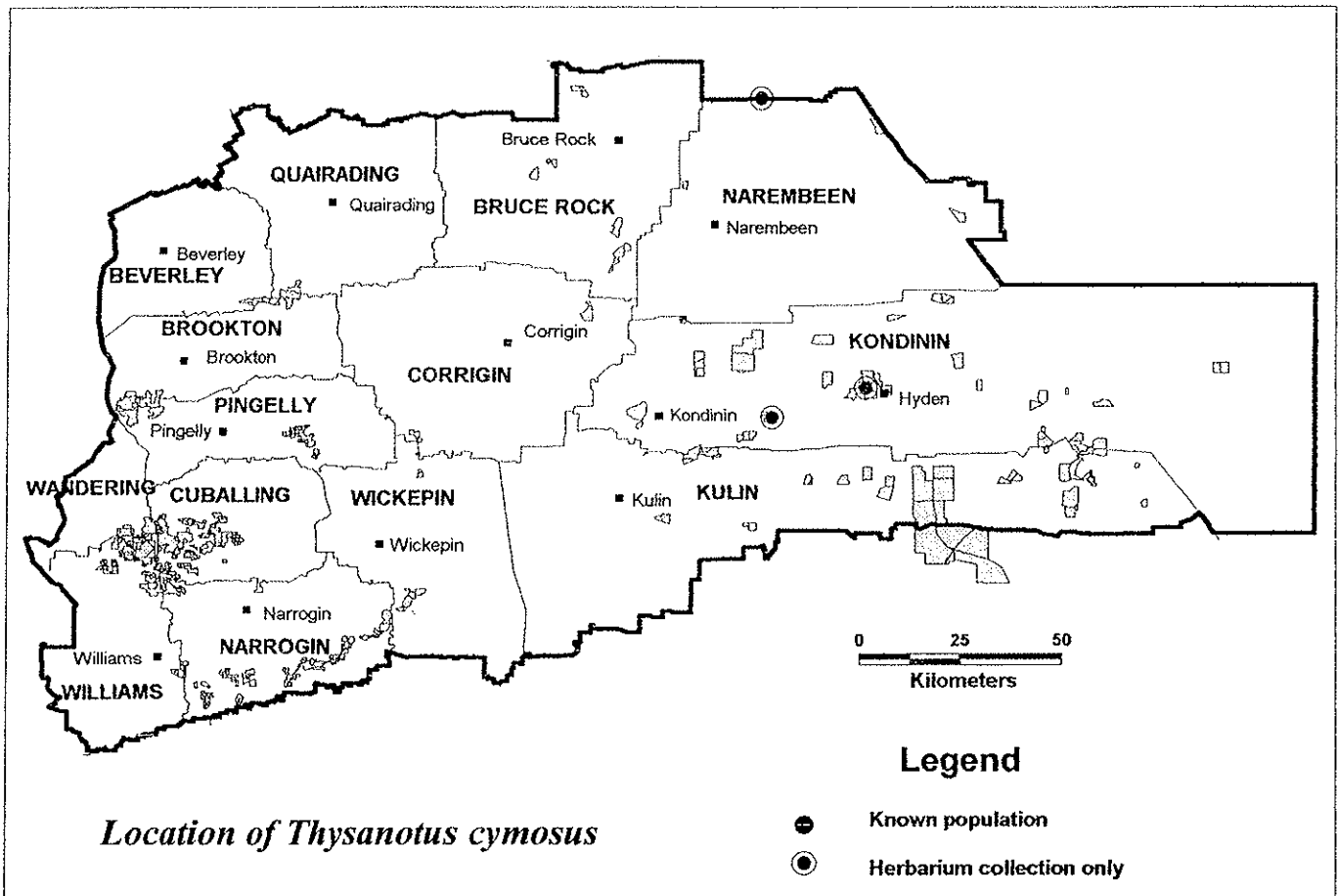
Management Requirements

- Nil until populations are located in the District.

Research Requirements

- Survey to relocate populations 4 and 5. Survey for new populations on conservation reserves.

References Brittain (1987).



Trachymene anisocarpa (Turcz.) Burt.

APIACEAE

A medium sized spreading herb 10 - 25 cm tall with white flowers. It has large hairs on the stems that usually appear as simple but often have a minute glandular apex. The fruit has one maturing fruitlet which is dorsally compressed, with four widely separated narrow marginal ridges or wings and a thick central ridge on the apical margin, wrinkled with a few traverse furrows on each surface between the wings. This species belongs to the carrot family that may be characterised by the umbrella-like inflorescence, although the irregular branching of some Australian species makes this less obvious.

Flowering period: ?- November -?

Distribution and Habitat in the Narrogin District

Extends from Muntagin south to the Stirling Range National Park. It has previously been found in a creek bed containing coarse gritty sand over clay in association with *Eucalyptus occidentalis* woodland and lateritic sand. One collection records that the area was recently burnt.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|--------------|-------------|-------|-------------|---------------|-----------|
| 1*Bruce Rock | ? | Bru | ? | ? | Bailey |
| 2*Muntagin | 09/45 | Nar | ? | ? | Bailey |

Bru Shire of Bruce Rock
 Nar Shire of Narembeen
 * population known only as Herbarium record

Response to Disturbance

May respond favourably to fire.

Susceptibility to *Phytophthora* Dieback

Unknown.

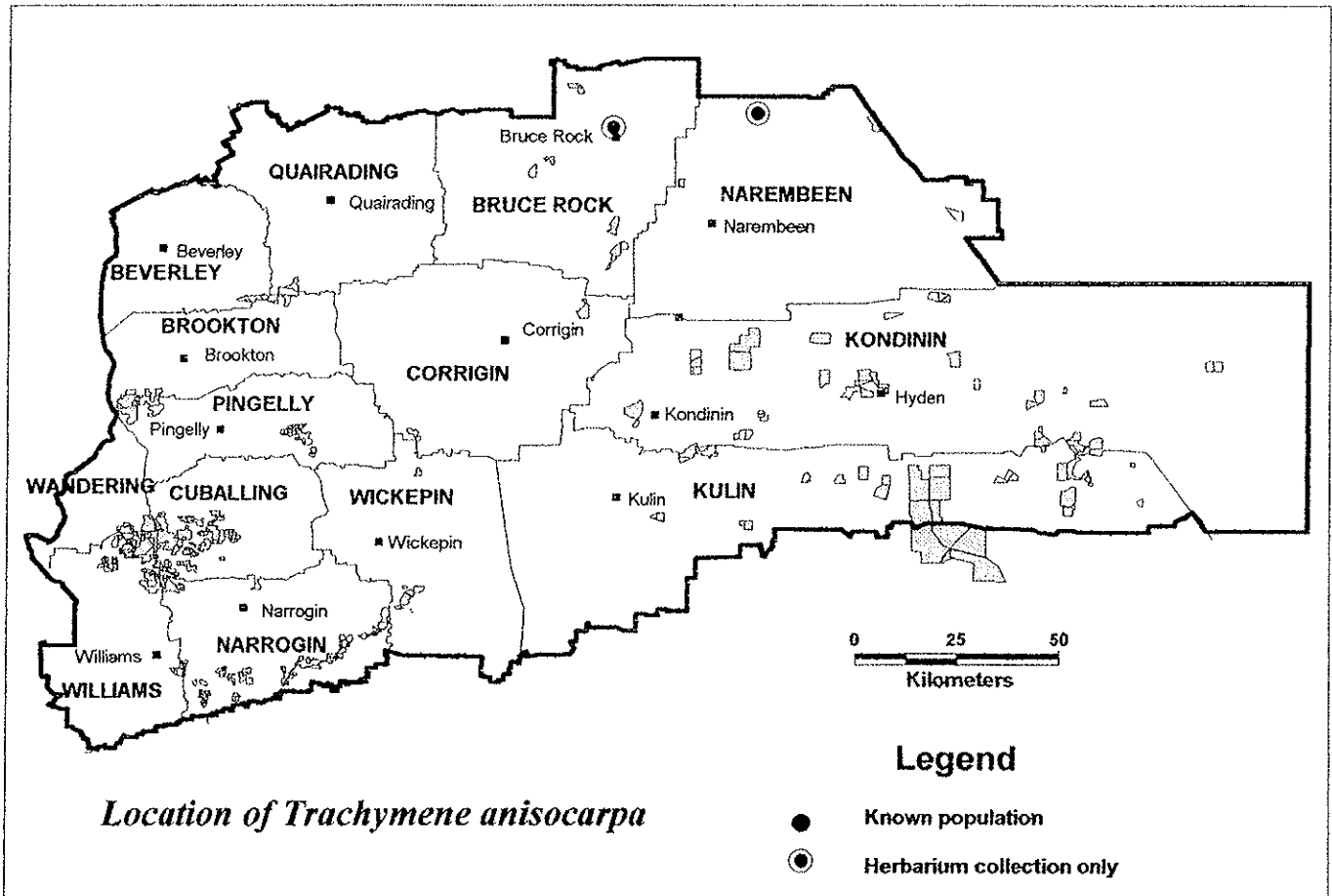
Management Requirements

- Nil until populations found.

Research Requirements

- Study herbarium specimens and survey to re-locate known Narrogin District populations.
- Survey for new populations on conservation reserves within known distribution range.

References



***Trachymene moorei* (Hiroe) subsp.**

***Tutanning* (A.S. George 12867) ms.**

APIACEAE

A plant with spreading non- glandular hairs and pale pink petals. The fruit is smooth on both fruitlets, if hairy then hairs all or mainly occurring on the margin. The fruitlets are dry with a distinct medial line, often with a few marginal hairs. It is a smaller plant than the typical subspecies. This subspecies belongs to the carrot family that may be characterised by the umbrella- like inflorescence, although the irregular branching of some Australian species makes this less obvious.

Flowering period: ?- September - ?

Distribution and Habitat in the Narrogin District

Known only from the Boyagin, Tutanning and Dryandra area, where it may be found in soil pockets associated with granite rock outcrops.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|--------------|-------------|-------|-------------|---------------|------------|
| 1* Tutanning | 21/09/74 | Pin | NR | ? | George A.S |
| 2=* Boyagin | | Pin | NR | ? | Reported |
| 3=* Dryandra | | Nar | SF | ? | Reported |

Pin Shire of Pingelly

Nar Shire of Narrogin

* population known only as Herbarium record

=* Reported population only

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

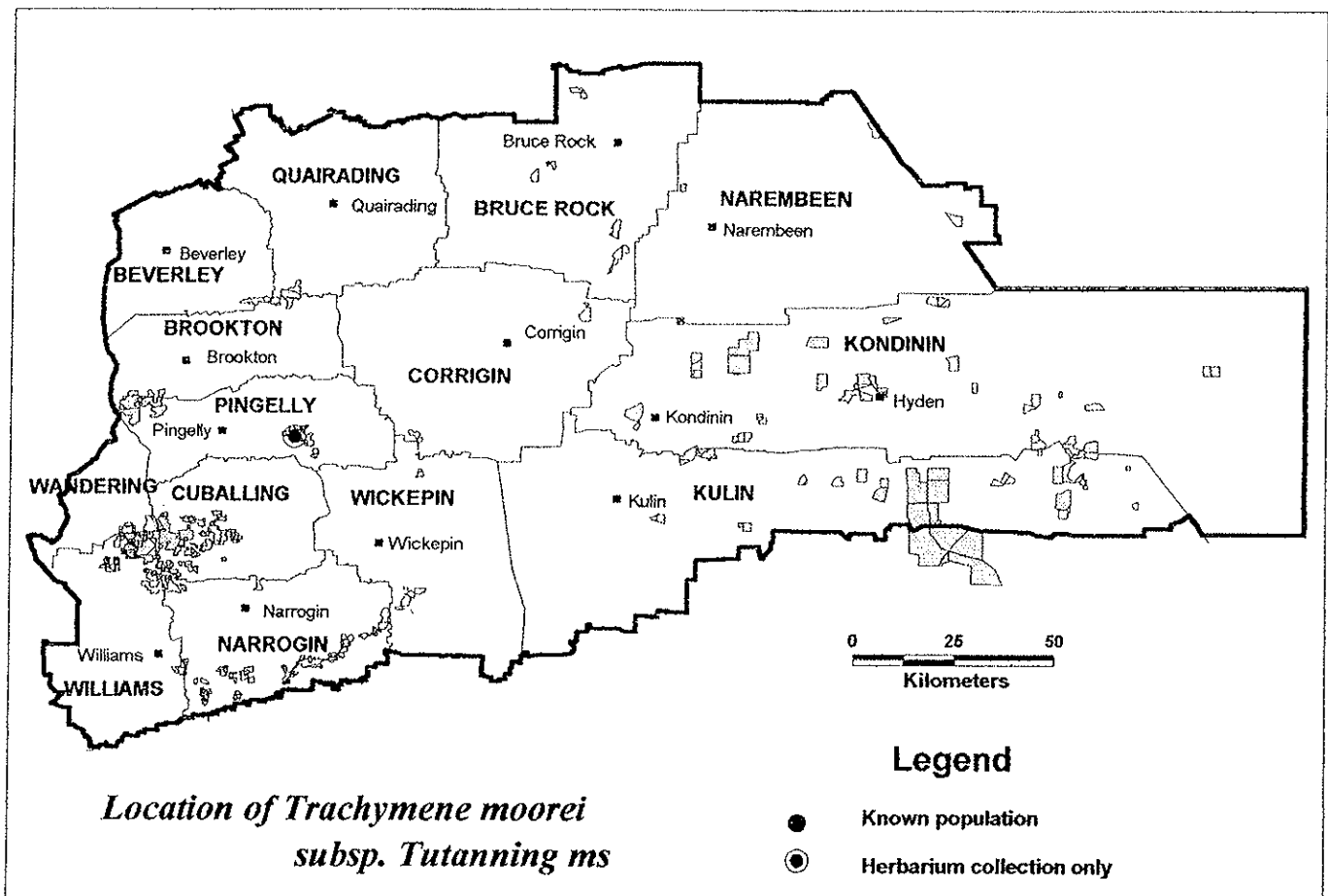
Management Requirements

- Nil until populations relocated.

Research Requirements

- Obtain information from A.E George concerning the location of populations.
- Survey to relocate known populations in the District.
- Survey for new populations on adjacent conservation reserves.
- Consider a change of status if populations are secure on conservation reserves.

References.



Triglochin stowardii N.E. Br.

JUNCAGINACEAE

T. stowardii is an erect annual herb, 15-17 cm tall. It is hairless and reddish in colour. The leaves are cylindrical, threadlike, 3-5 cm long and 0.5 mm wide. The main flower stalk is up to 12 cm long. The flower head consists of 2-7 flowers. The 6-segmented, egg to lance shaped flowers are green to green-yellow in colour. There are 6 stalkless anthers. The perianth consisting of 6 segments. The fruit is 1.5 cm long.

The species is named after Fredrick Stoward a botanist with the Department of Agriculture, WA in about 1950.

Flowering period: August - September.

Distribution and Habitat in the Narrogin District

T. stowardii is widely distributed from near Moora to Highbury and Busselton. The plant prefers winter wet areas and salt flats. In the Narrogin District it has been found in alluvial soils along the Arthur River. Near Busselton it occurs with *Melaleuca cuticularis* in low woodland. In the Narrogin District, *T. stowardii* will probably tend to occur in salt prone areas.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|----------------|-------------|-------|-------------|---------------|-----------|
| 7*Arthur River | 29/09/71 | Nar | ? | ? | Unknown. |
| 7 Arthur River | 30/08/94 | Nar | NR | Nil Found | Unknown. |

Nar Shire of Narrogin

* population known only as Herbarium record

Response to Disturbance

Salt may be detrimental to the survival of *T. stowardii* in the Narrogin District. Other disturbance responses are unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

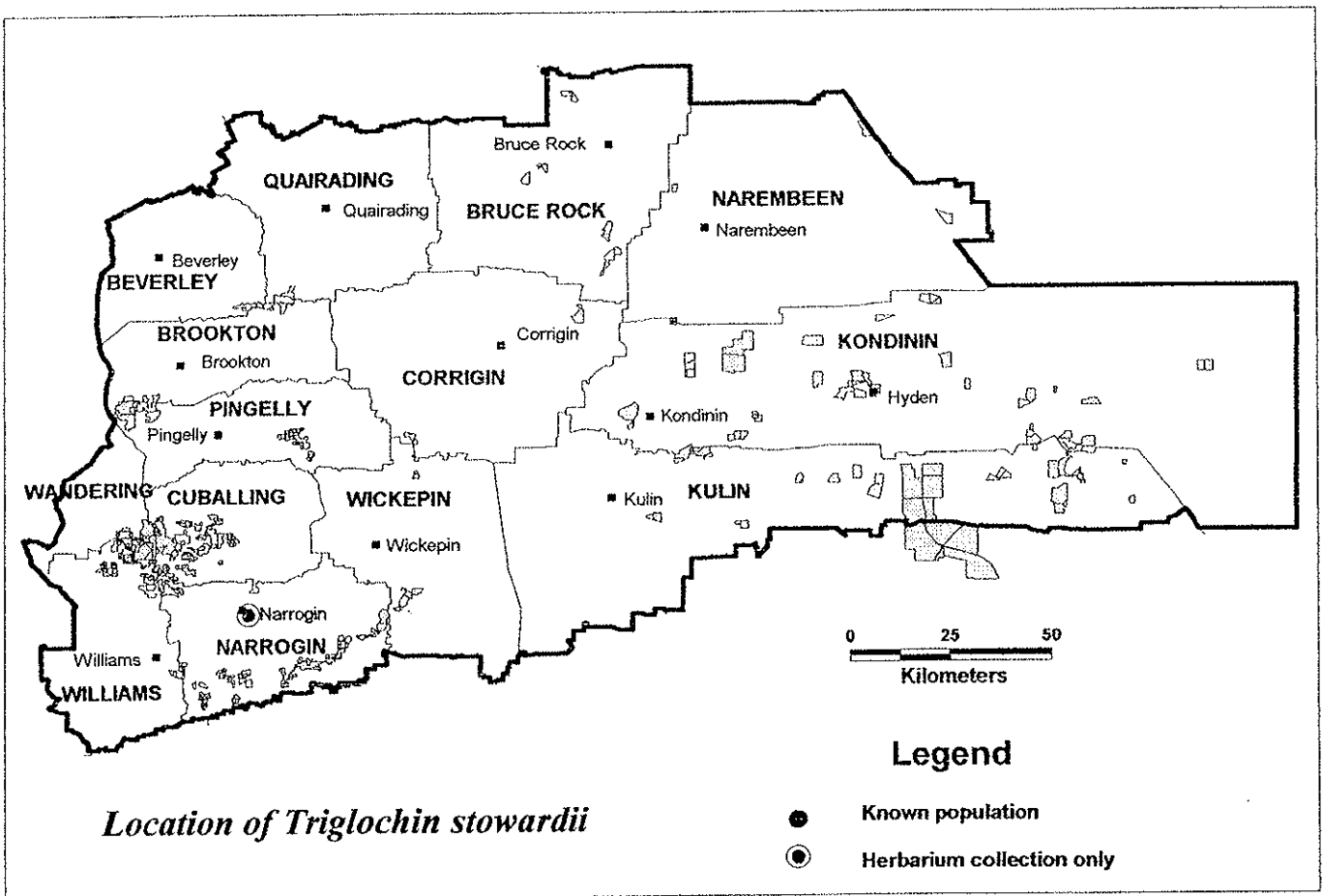
Management Requirements

- Nil.

Research Requirements

- Survey on conservation reserves containing alluvial flats.

References Brown (1914), Blackall and Grieve (1974).



Verticordia bifimbriata George

MYRTACEAE

An erect straggling feather flowering shrub to 50 cm tall with pink petals and calyx lobes and light greyish-green leaves. The staminodes and filaments are light pink, the anthers reddish. The stigma and style is light pink. Differs from other species of *Verticordia* especially in the fringe segments of the petals being themselves fringed and in the thick hypanthium appendages with acute free apex. The 1.5-4 mm leaves are narrowly elliptic. The sepals are 5-6 mm long with 6 or 7 lobes, auriculate. Petals are 5.5-6.5 mm long with a fringe to 2.5-3 mm long. Stamens are 3mm long. Staminodes are 1.5-1.6 mm long. Style 5-6 mm long. The bifimbriate petals distinguishes this species. May also be distinguished from *V. paludosa* by the presence of auricles to the sepals, by the reflexed appendages of the hypanthium being free from the hypanthium towards their apices and the slightly larger flowers.

Flowering period: Late November- January. Also March and early April.

Distribution and Habitat in the Narrogin District

Occurs between Mogumber, New Norcia and Bindoon southwards to Dryandra State Forest, occurring in lateritic gravel, sometimes in yellow sand/gravelly sand in eucalypt open woodland, with *Eucalyptus calophylla*, *E. marginata*, *Leptospermum erubescens*, *Calothamnus sanguineus*, *Melaleuca scabra* and *Adenanthos cygnorum*.

Conservation Status

Current: Priority 2

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|-------------|-------------|-------|-------------|---------------|-----------|
| 1* Dryandra | 23/12/87 | Wan | SF | Frequent | Rose |
| 2* Dryandra | 28/01/95 | Wan | SF | 50+ | Cochrane |
| 3* Boyagin | 08/04/82 | Pin | NR | 1 | Bell |

Wan Shire of Wandering

Pin Shire of Pingelly

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

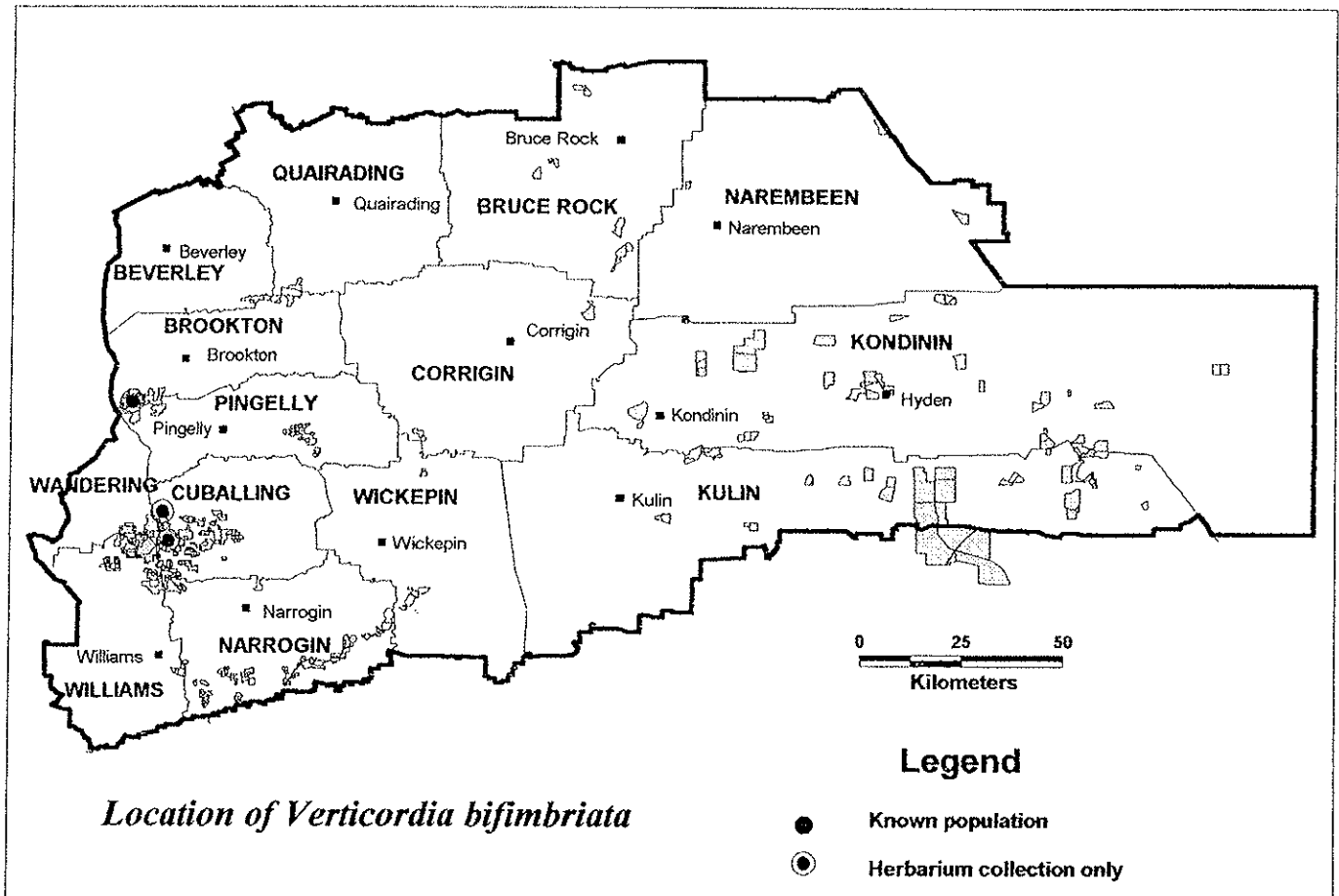
Management Requirements

– Nil until populations relocated.

Research Requirements

- Survey to relocate known populations at Dryandra State Forest and Boyagin Nature Reserve.
- Survey for new populations in Dryandra State Forest and on adjacent conservation reserves with similar habitat.

References George (1991).



C. Priority Three Taxa

Acacia anarthros Maslin

MIMOSACEAE

A. anarthros is a dense compact rounded shrub to 30 cm high and is characterised by its leaf axes extending downwards along the stem, the leaf consisting of two leaflets, and pungent stipules. There are 14 - 16 round bright yellow flowers per head. The legumes are 4 cm long, hard, brittle and narrowly oblong in shape. Some bushes may be sterile. The species is named from the Latin word *anarthros*, in relation to the stalk of the leaf continuing down the stem in a raised line or narrow wing.

Flowering period: June - August.

Distribution and Habitat in the Narrogin District

Most of the known populations occur in the Moora District. However, in the Narrogin District it is recorded from east of Brookton and near Bruce Rock.

A. anarthros occurs in a variety of habitats ranging from yellow sand to laterite and loam. It appears to favour open Wandoo woodland, but occurs with Wandoo/Marri Woodland and in low open heathland.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|---------------|-------------|-------|-------------|---------------|-----------|
| 19 Mears | 30/08/94 | Bro | RVS | Scatt/Comm | Healthy |
| 20 Bruce Rock | 31/08/94 | Bru | RVS | Several | Healthy |

Bro Shire of Brookton

Bru Shire of Bruce Rock

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

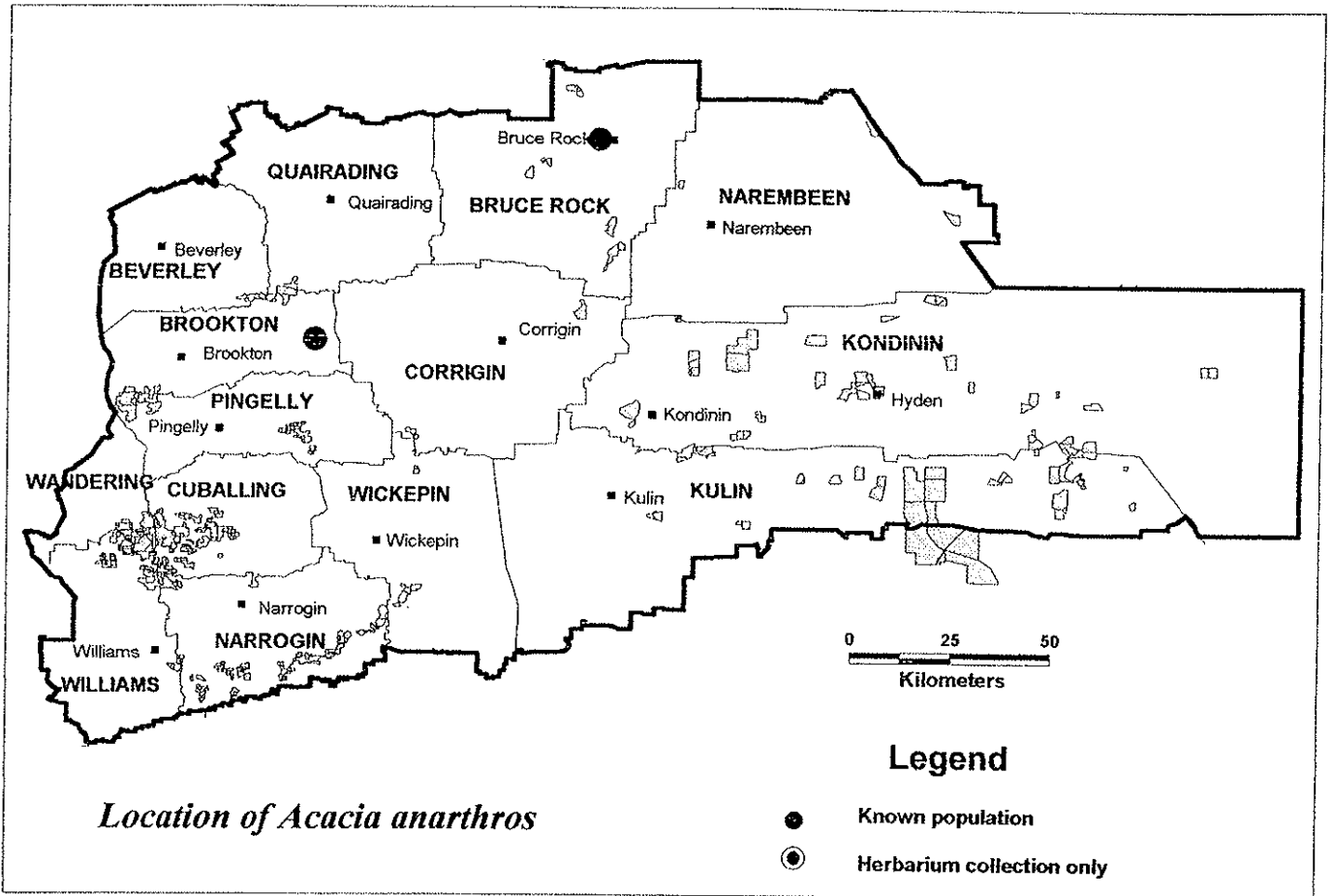
Management Requirements

-- Monitor populations occasionally

Research Requirements

- Further opportunistic surveys

References Maslin (1979).



Acacia ancistrophylla* var. *perarcuata

(Andrews) Cowan & Maslin ms.

MIMOSACEAE

A, tall, rounded or cone shaped spreading shrub, 6-1.6 metre by 6 metre wide. The 1.2-2.3 cm long and 2.5-4 mm wide phyllodes are blunt with a spiny tip, curving upward, the nerves and stomata are obscure. Flower heads number 11- 15 flowers. The legumes are small, not constricted between the seeds and noticeably bowed to once-coiled. The species varietal name refers to the fish hook shape of the leaf.

Flowering period: September.

Distribution and Habitat in the Narrogin District

Known from Mukinbudin, Merredin and Moorine Rock and between Merredin and Bruce Rock. Its habitat is brown loams and clayey loams in association with Gimlet and Salmon Gum woodland.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|---------------|-------------|-------|-------------|---------------|-----------|
| 5* Bruce Rock | 05/08/71 | Bru | ? | ? | Maslin |
| 6* Bruce Rock | 27/08/73 | Bru | ? | ? | Tindale |

Bru Shire of Bruce Rock

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

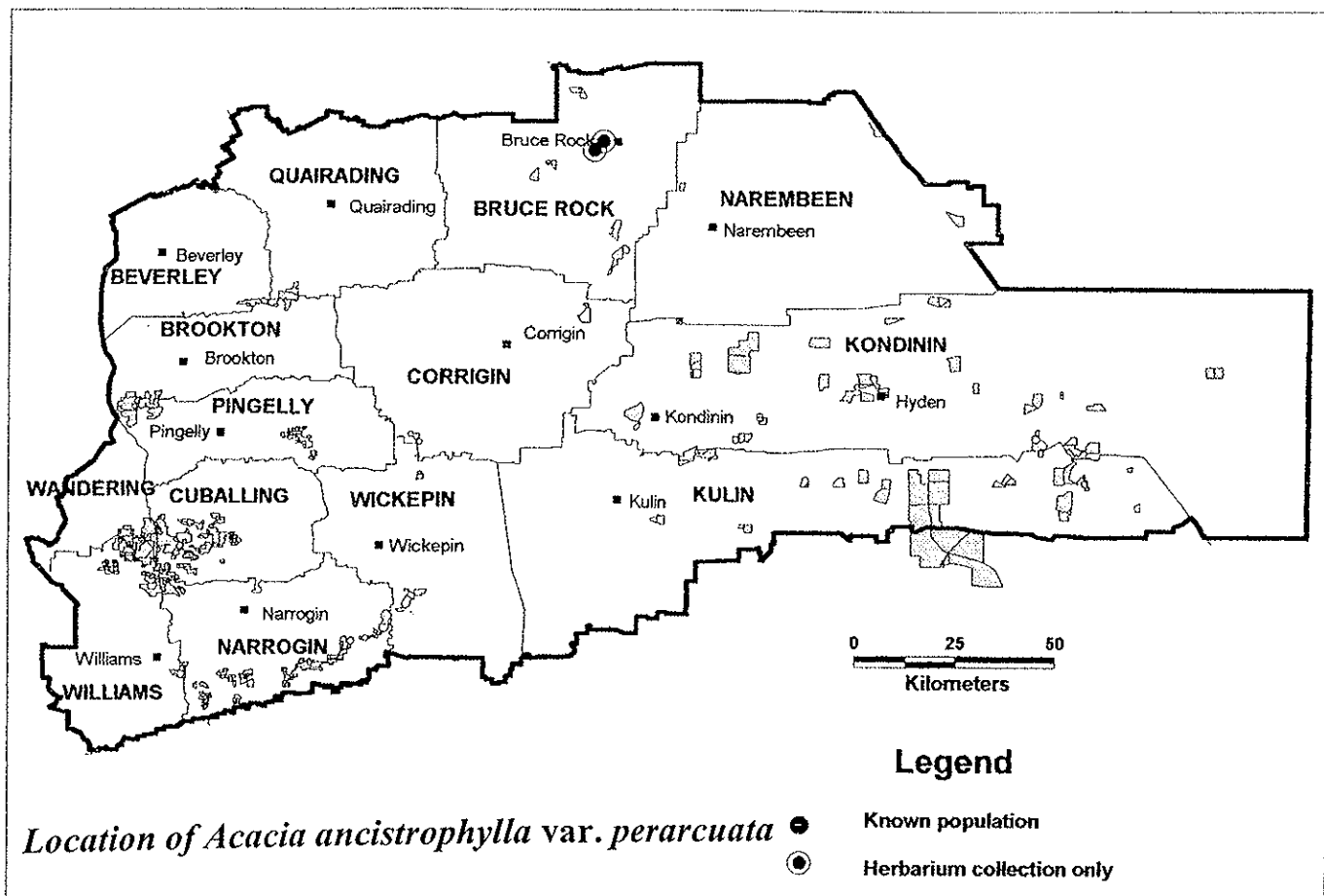
Management Requirements

- Consider a change of status to Priority two. All Herbarium vouchers are older than 15 years old. In the Narrogin District it has not been collected for 21 years.

Research Requirements

- Survey to locate populations 5 and 6.
- Survey to locate new populations on conservation reserves.

References Andrews (1904), Cowan & Maslin (personal communication).



Acacia brachyphylla var. *recurvata* Cowan & Maslin

MIMOSACEAE

A small 0.2-0.3 metre tall shrub with hairy branchlets. The 8-10 mm long phyllodes are narrow, with the tip recurved to almost a hook with a spiny tip and turning upward. The 6 widely-spaced nerves have pimple-like protuberances and may be hairy. A gland occurs at the base of the phyllode. The hairless flower stalk is 6-8 mm long. The pods up to 2 cm long and 1.5-3 mm wide, mostly hairless. Easily distinguished from *A. brachyphylla* var. *brachyphylla* by its longer phyllodes with recurved tip and mostly hairless pods. The species name refers to the small phyllodes and the variety name describes the recurved phyllode tips.

Flowering period: September.

Distribution and Habitat in the Narrogin District

Most of the known populations occur from Kukerin to near Jerramungup. Only one population near Highbury is known in the Narrogin District. It occurs in shrubland, often in gravelly loam or sand.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|------------|-------------|-------|-------------|---------------|-----------|
| 4 Highbury | 10/07/89 | Nar | SF | ? | Unknown. |

Nar Shire of Narrogin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

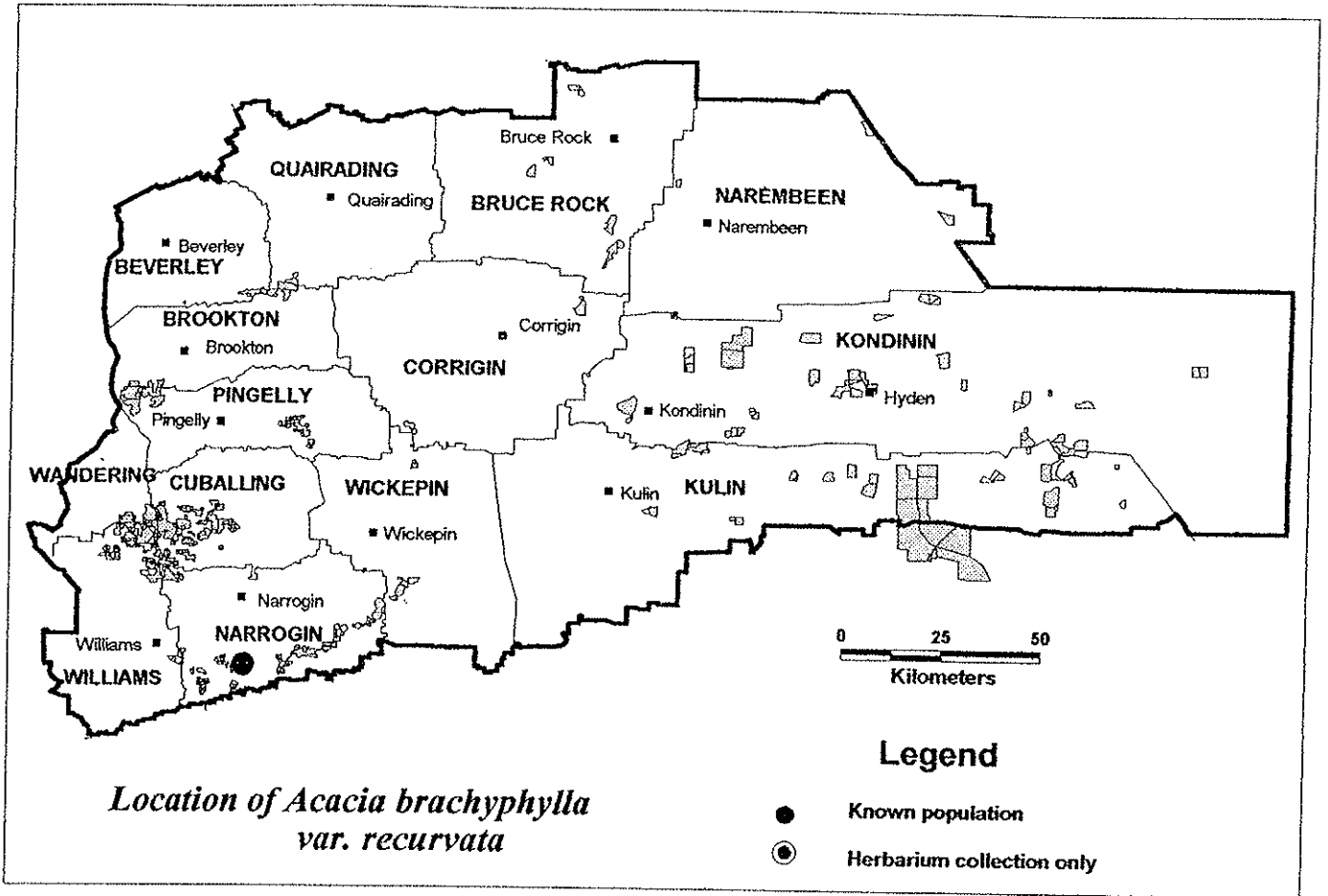
Management Requirements

- Consider change of status to Priority two. Most collections were in the 1960s and 70s. The most recent collection was population number 4 in 1989.

Research Requirements

- Survey to relocate population number 4 in the Highbury State Forest. Determine habitat.
- Survey surrounding blocks associated with the Highbury State Forest.

References Cowan & Maslin (1993), Cowan & Maslin (personal communication).



Acacia dissona var. *indoloria* R.S Cowan & Maslin

MIMOSACEAE

A shrub 0.5 to 2 metres tall with branches often contorted and the branchlets ridged with appressed hairs. The 2 - 4 cm long and 1-1.5 mm wide, ridged, straight, glabrous phyllodes are round in cross section, or almost so, rather abruptly narrow to sharply pointed or with short sharp pointed tips, with a slight swelling at the phyllode base and nerves paler than the inter-nerve spaces. The inflorescence is simple with 2 per axil. The peduncles are mostly 2-4 mm long and glabrous. The globular flower heads are golden, 5-6 mm in diameter and 20 flowered. Sepals are free. The legumes are linear, scarcely constricted, 6cm long and 2.5 mm wide, dry and brittle. The 2.5 - 3.5 mm seeds are longitudinal, oblong - elliptic with a pale yellow, terminal, helmet shaped aril.

The species comprise two closely related varieties, the other being var. *dissona*. which has sharply pungent phyllodes, nerves and inter-nerve spaces are often uniform in colour, pods distinctly constricted between the 4.5 mm long seeds and a cone-shaped aril.

A member of the *A. densiflora* group. Similar to *A. mackeyana* which commonly has recurved phyllodes and subterete, thick walled, leathery legumes. Also resembles *A. kalgoorliensis* which has longer phyllodes with protracted, long spinose tips.

Flowering period: August - September.

Distribution and Habitat in the Narrogin District

A plant of scattered and discontinuous distribution from an area from Ballidu to Mollerin, Bruce Rock to Muntagin and the Frank Hann National Park, growing in sand, sandy loam and loam, mostly associated with open eucalyptus mallee.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|---------------|-------------|-------|-------------|---------------|-----------|
| 1* Bruce Rock | 10/32 | Bru | ? | ? | Unknown. |
| 2* Bruce Rock | 09/33 | Bru | ? | ? | Unknown. |

Bru Shire of Bruce Rock

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

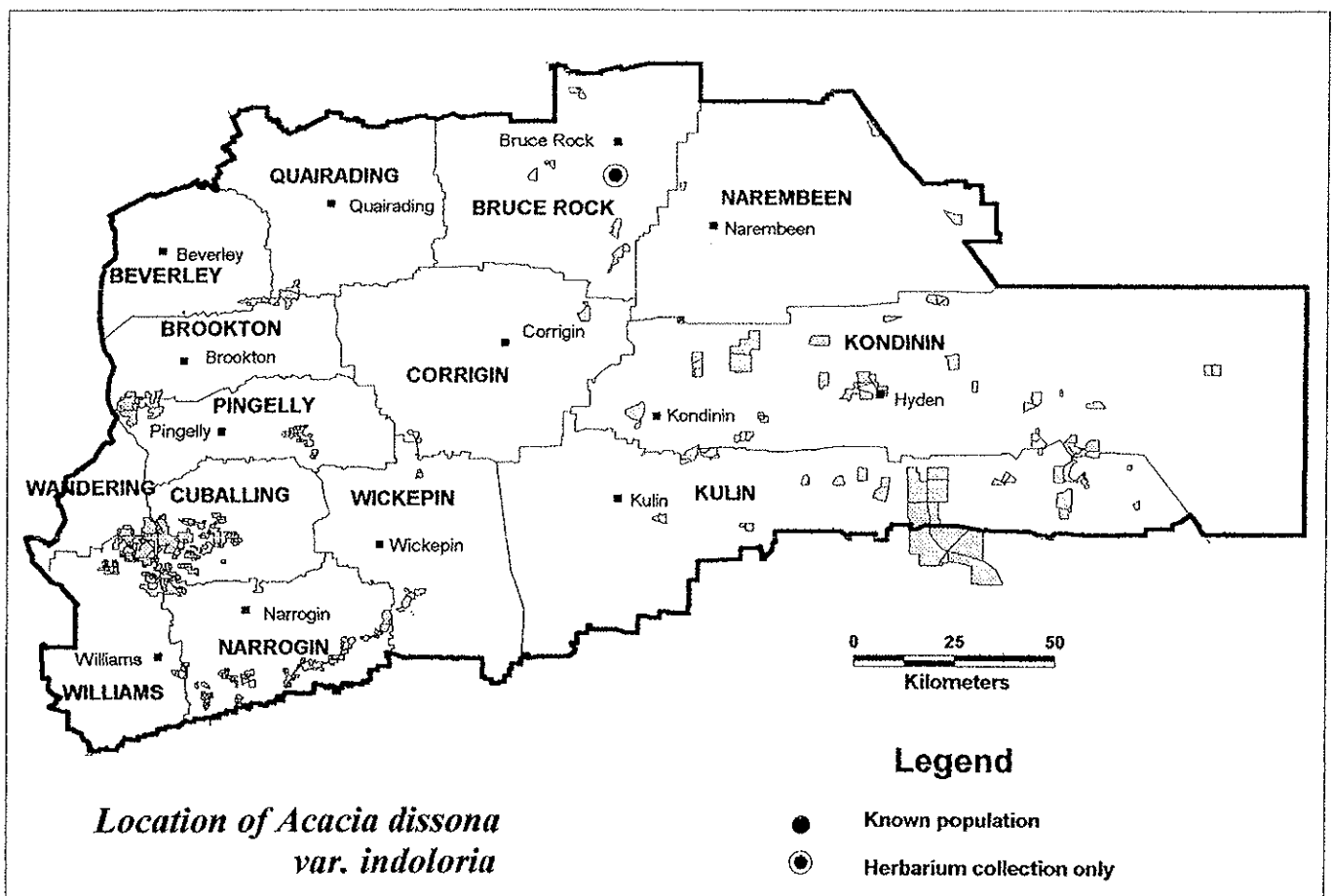
Management Requirements

- Nil until populations relocated.

Research Requirements

- Survey opportunistically, relocate previous old collections near Bruce Rock
- Survey for new populations on conservation reserves in the Shires of Bruce Rock and Narembeem.

References Maslin B. (Personal communication.).



Acacia eremophila var. *variabilis* Maiden & Blakely

MIMOSACEAE

A shrub to 1-1.6 metres tall. The phyllodes are 5-11 cm long and 1-1.5 mm diameter. The 2 mm long peduncles are sparsely to densely hairy with sometimes sticky hairs. The flower heads consist of 20-25 flowers. The 5 cm long and 1.5-3 cm wide legume is wavy, hairy and constricted between seeds.

Flowering period: September.

Distribution and Habitat in the Narrogin District

A species with populations well isolated from surrounding ones. It is a widespread occurring species with scattered populations. Populations have been found near Bruce Rock in the Narrogin District, 100 kilometres north- north west of Kalgoorlie, 200 kilometres east of Kalgoorlie and near Balladonia. There is little habitat information available however, it may inhabit sand or sandy loam in low woodland or shrubland vegetation.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|------------|-------------|-------|-------------|---------------|-----------|
| 1 Ardath | 17/12/89 | Bru | ? | ? | Unknown. |

Bru Shire of Bruce Rock
* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

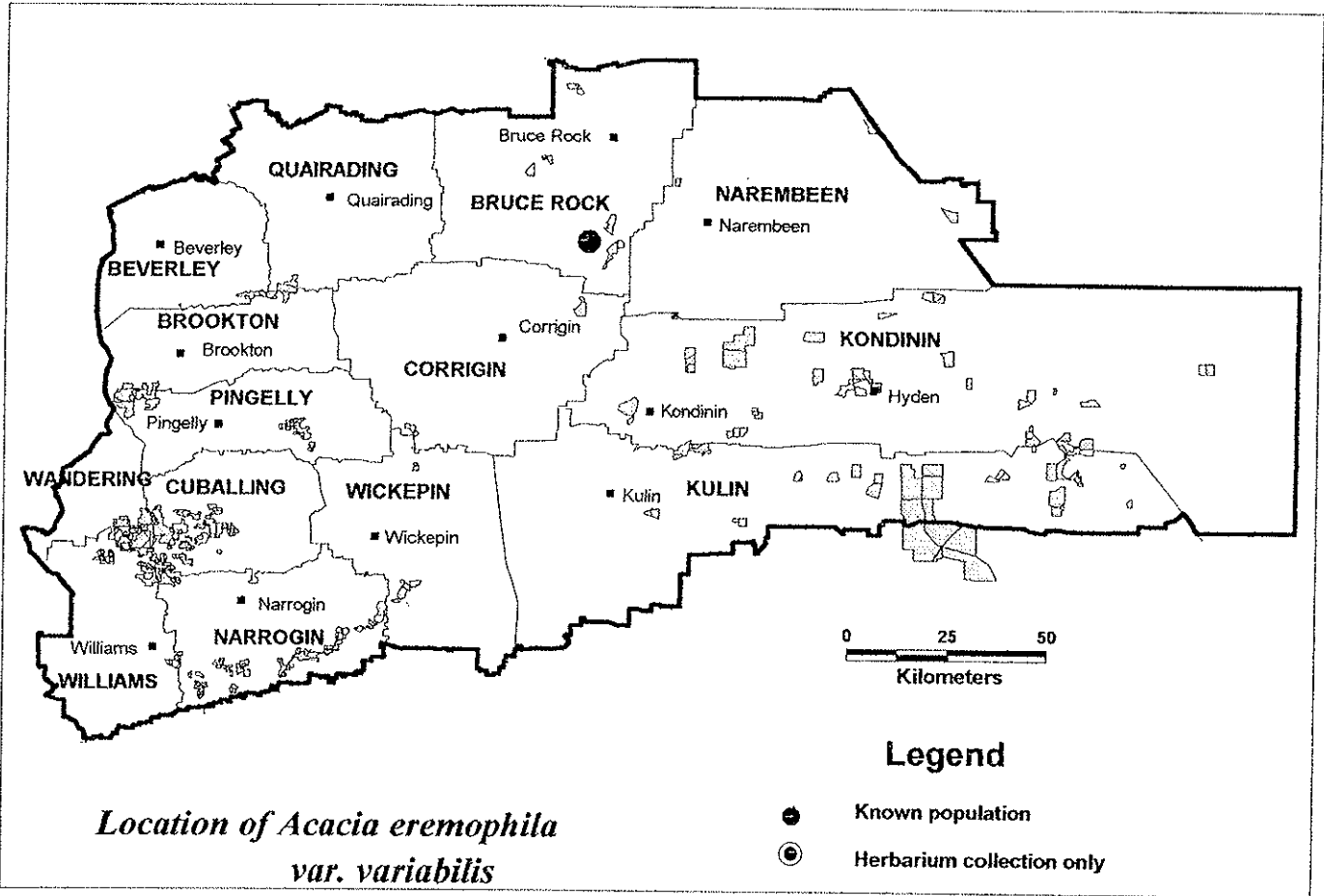
Management Requirements

- Consider change of status to Priority two. Apart from population number 4, all previous populations were located during or prior to the 1970's.

Research Requirements

- Survey opportunistically on conservation reserves with similar habitat.
- Survey to relocate population number 4.

References Maiden & Blakely (1928), Maslin (personal communication).



Acacia filifolia Bentham

MIMOSACEAE

A wispy appearing, open, single-stemmed shrub or tree to 3 metres tall. The branchlets are somewhat angular with sticky ribs and are sometimes slightly bent in a zigzag manner. The 8-25 cm long and 0.7-1 mm, yellow-green phyllodes are rounded and 4 angled, tapering to a point, stalkless, upward curving, slightly incurved with 8 nerves, one on each face. The almost stalkless, 8-12 mm long, and 7 mm diam golden flower heads occur in 1 or 2's. The flowers are in 4-parts with united sepals. The 12 cm long and 3 mm wide legumes are linear with yellow margins. The 2-3 mm long seed are glossy, mottled grey-brown and brown, drying yellowish. The species name refers to the slender phyllodes.

Flowering period: June- September.

Distribution and Habitat in the Narrogin District

Widely distributed from Three Springs southwards to near Pingaring. Most populations are known from Wongan Hills and Merredin to Southern Cross. There are four reported occurrences in the Narrogin District, growing in yellow sand and sand over laterite in heath and tall shrubland or open woodland.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|----------------|-------------|-------|-------------|---------------|-----------|
| 9* Muntadgin | 16/08/64 | Nar | ? | ? | Goodwin |
| 10 Narembreen | 09/09/88 | Nar | ? | ? | Maslin |
| 11* Narembreen | 16/08/64 | Nar | ? | ? | Goodwin |
| 13* Pingaring | 15/08/64 | Kul | ? | ? | Goodwin |

Nar Shire of Narembreen

Kul Shire of Kulin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

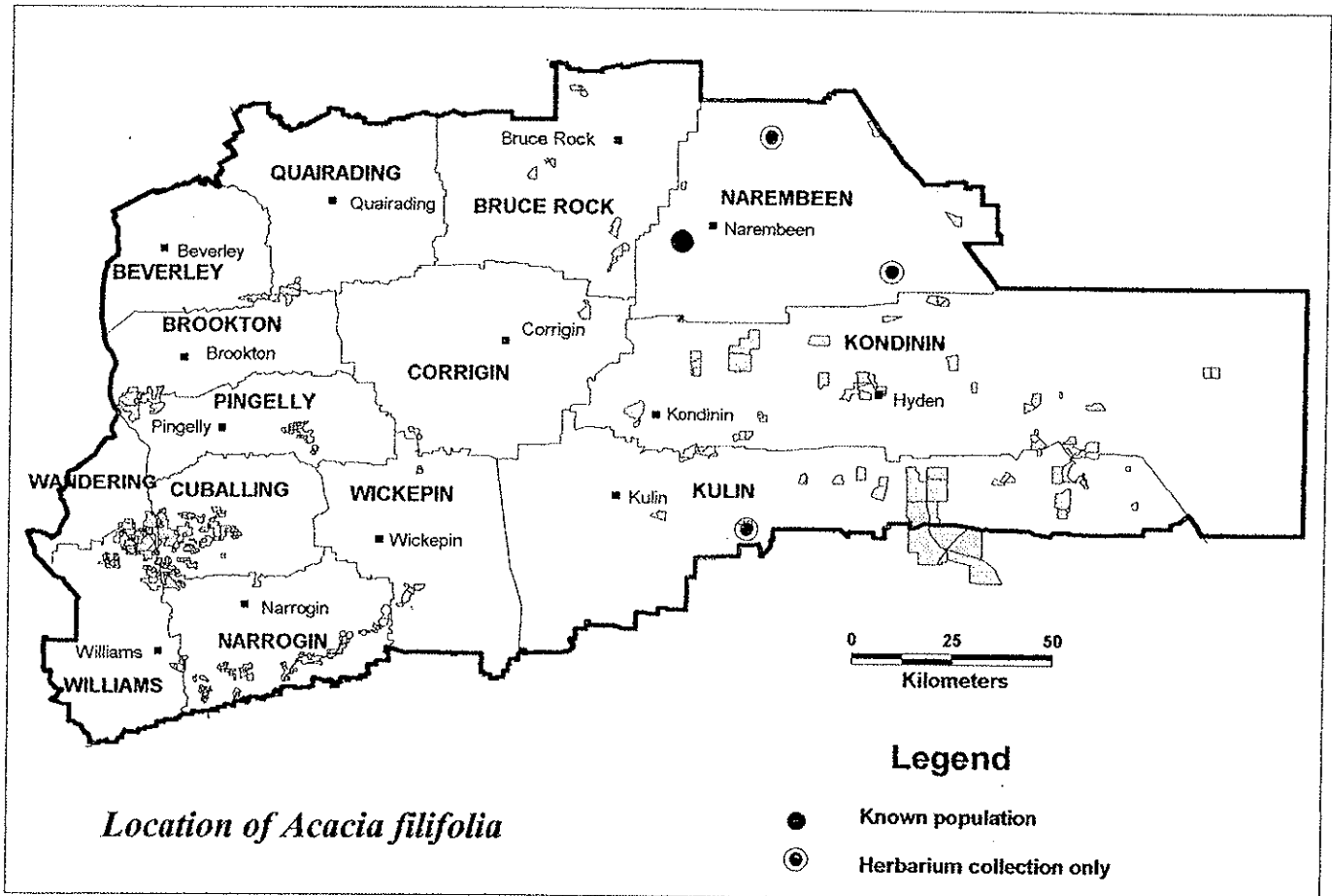
Management Requirements

– Monitor known populations occasionally.

Research Requirements

- Survey opportunistically, on conservation reserves with heath vegetation on yellow sand or sand with some laterite.

References Bentham. (1842), Maslin (personal communication).



Acacia inophloia Maiden & Blakely

MIMOSACEAE

The Fibre Bark Wattle is a shrub or tree from 1-3.5 metres tall with fibrous, stringy, shaggy bark in long strips that remain attached to the plant. The bark is grey on old trunks and the new bark is red-brown. The angular branchlets are covered with short, straight silky hairs and may be sticky. The 6-15.5 cm long, 0.6-0.8 mm diameter phyllodes are cylindrical, densely covered with short hairs, the tips may be slightly curved and taper suddenly to a point. The 8 parallel, strongly raised nerves are obscured by hairs. The flower stalk is 0.7-2 mm long. The oblong to cylindric, 8-13 mm long and 4-6 mm diameter flower heads are 50-75 light-golden flowered. Flowers 5 are parts. The 8 cm long, 2.5-4 cm wide linear legumes are slightly raised over the seeds, slightly curved and densely hairy. The seeds are 3-3.5 mm long, glossy, mottled brown. The species name refers to the fibrous-stringy bark.

Flowering period: August.

Distribution and Habitat in the Narrogin District

Known from the Pederah and Bendering area, Muntadgin and about 270 kilometres away near Moora. It grows in gravelly sand, sand and sandy loam, sometimes near granite and granite rocks.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|------------------|-------------|-------|-------------|---------------|-----------|
| 1 Pederah | 17/12/89 | Kon | RVM | c 10 | Not known |
| 2* Bendering | 8/1963 | Kon | ? | ? | Not known |
| 3 South Kumminin | 27/08/73 | Kon | RVM | ? | Not known |
| 4* Bendering | 19/12/89 | Kon | ? | ? | Not known |
| 7 Wyalcutting | 06/10/94 | Bru | NR | c 10 | Not known |

Kon Shire of Kondinin

Bru Shire of Bruce Rock

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

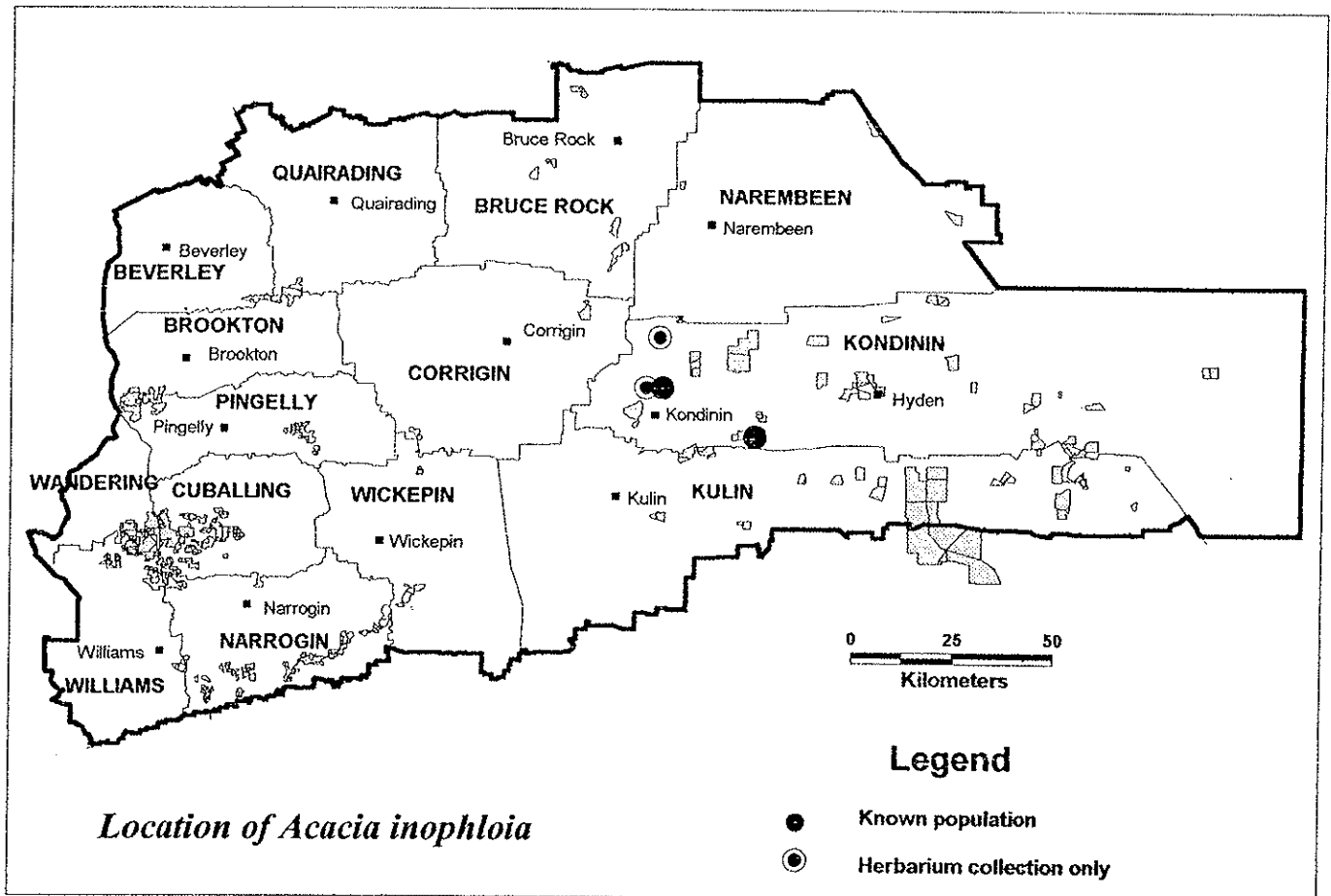
Management Requirements

- Ensure population number 7 is protected during reserve management operations.

Research Requirements

- Survey to confirm species identification, numbers and habitat of population number 7.
- Survey to locate new populations on conservation areas within known distribution.

References Maiden & Blakely (1928), Maslin (personal communication).



Acacia insolita subsp. *efoliolata* (Pritzell) Maslin ms.

MIMOSACEAE

A small, 0.4-0.7 metre tall shrub with wiry stems with the bipinnate leaves falling off and only a few may remain at the base of mature plants. The 3-9 cm long and 1-3 mm wide phyllodes are flat with a prominent midrib, sometimes quadrangular. The flower heads are golden. The legume is 4-7 mm wide. The species name refers to being uncommon and the subspecies name refers to, without leaf.

Flowering period: July, August.

Distribution and Habitat in the Narrogin District

Known from four populations, three of which occur in the Narrogin District, on laterite hills and dense sandplain scrub.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-------------|-------------|----------|-------------|---------------|--------------|
| 1 Pingelly | 03/08/95 | Pingelly | NR | 80+ | Good |
| 2 Tutanning | 04/08/95 | Pingelly | NR | 3 | Undisturbed |
| 3 Brookton | 03/08/95 | Brookton | RVS | 20 | Not recorded |

Pin Shire of Pingelly

Bro Shire of Brookton

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

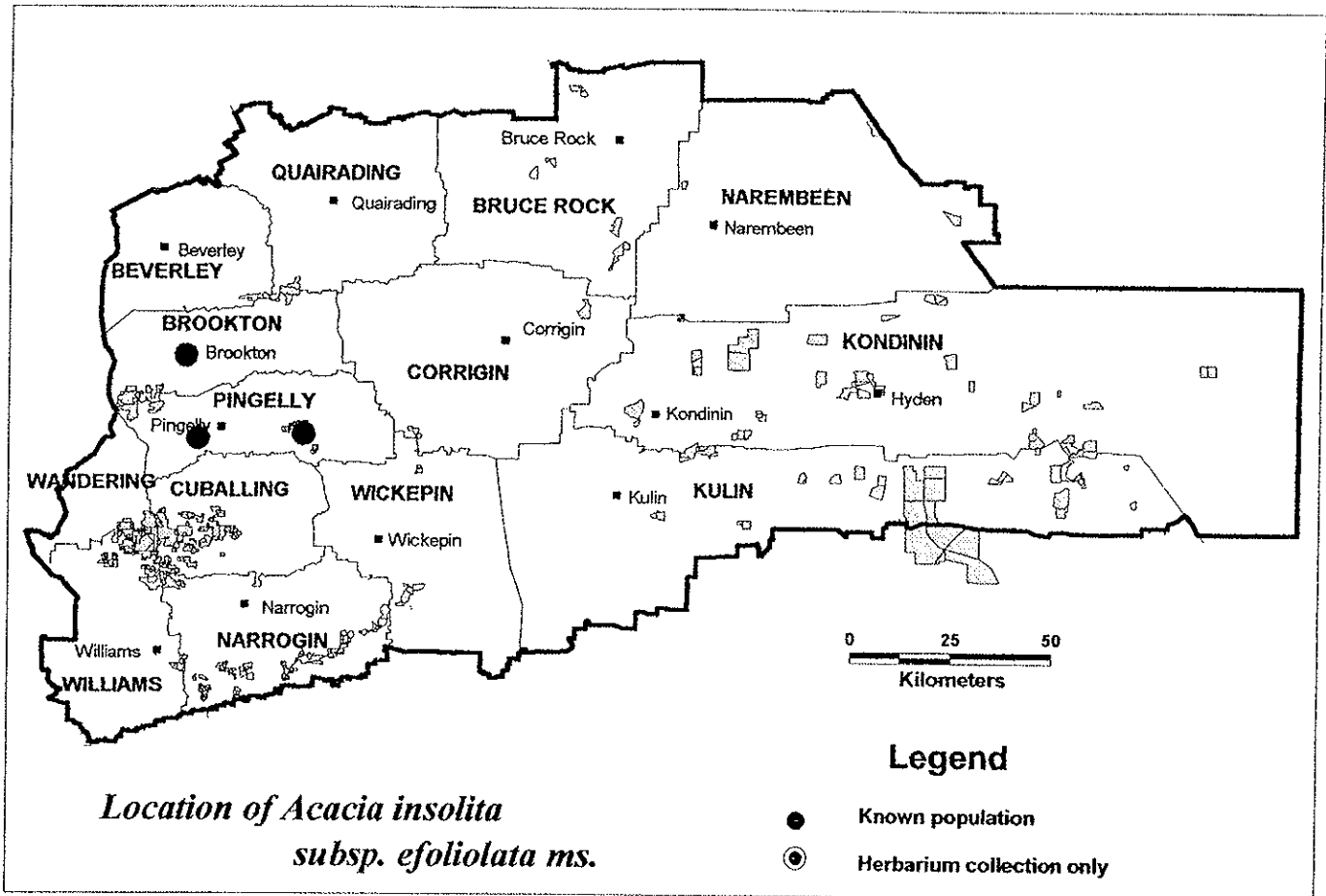
Management Requirements

- Monitor known populations occasionally.
- Ensure population number 1 and 2 are protected during reserve management operations.

Research Requirements

- Survey opportunistically for new populations on conservation reserves with similar habitat in the Pingelly - Brookton area.

References Pritzell (1904), Maslin (personal communication).



Acacia newbeyi Maslin

MIMOSACEAE

A small to medium sized open branched shrub from 0.5-1 metre tall by 0.6-1.5 metre wide. The branches are usually divided near ground level into 2-4 main branches. The medium grey bark is slightly rough. The branches are slightly ribbed with the branchlets somewhat spiny. Stipules are minute, 0.5 mm long, oblong to triangular and thickened toward the base. The leaves have 2 leaflets. The petiole small, less than 0.5 mm long. The light yellow spherical flower heads are 3-4 mm diameter, with 10-13 flowers per head. Flowers 5 parts. The light brown legumes 20-25mm long x 3 mm wide are prominently raised over seeds, the margins not contracted between seeds, and somewhat thickened. Seeds are dark brown and shiny.

Flowering period: July - August.

Distribution and Habitat in the Narrogin District

A. newbeyi occurs from Nyabing south to Boxwood Hill and east to Ravensthorpe. In the Narrogin District one population occurs the Dragon Rocks Nature Reserve. It appears to be confined to areas of sand over laterite and is associated with *Eucalyptus redunca* or *E. falcata*.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|----------------|-------------|-------|-------------|---------------|-----------------------|
| 2 Dragon Rocks | 1991 | Kul | NR | ? | Presumed undisturbed. |

Kul Shire of Kulin

* population known only as Herbarium record

Response to Disturbance

Believed to have a life span of about 5-8 years. Seeds readily germinate following fire or other environmental disturbances (K. Newbey personal communication with B. Maslin).

Susceptibility to *Phytophthora* Dieback

Unknown.

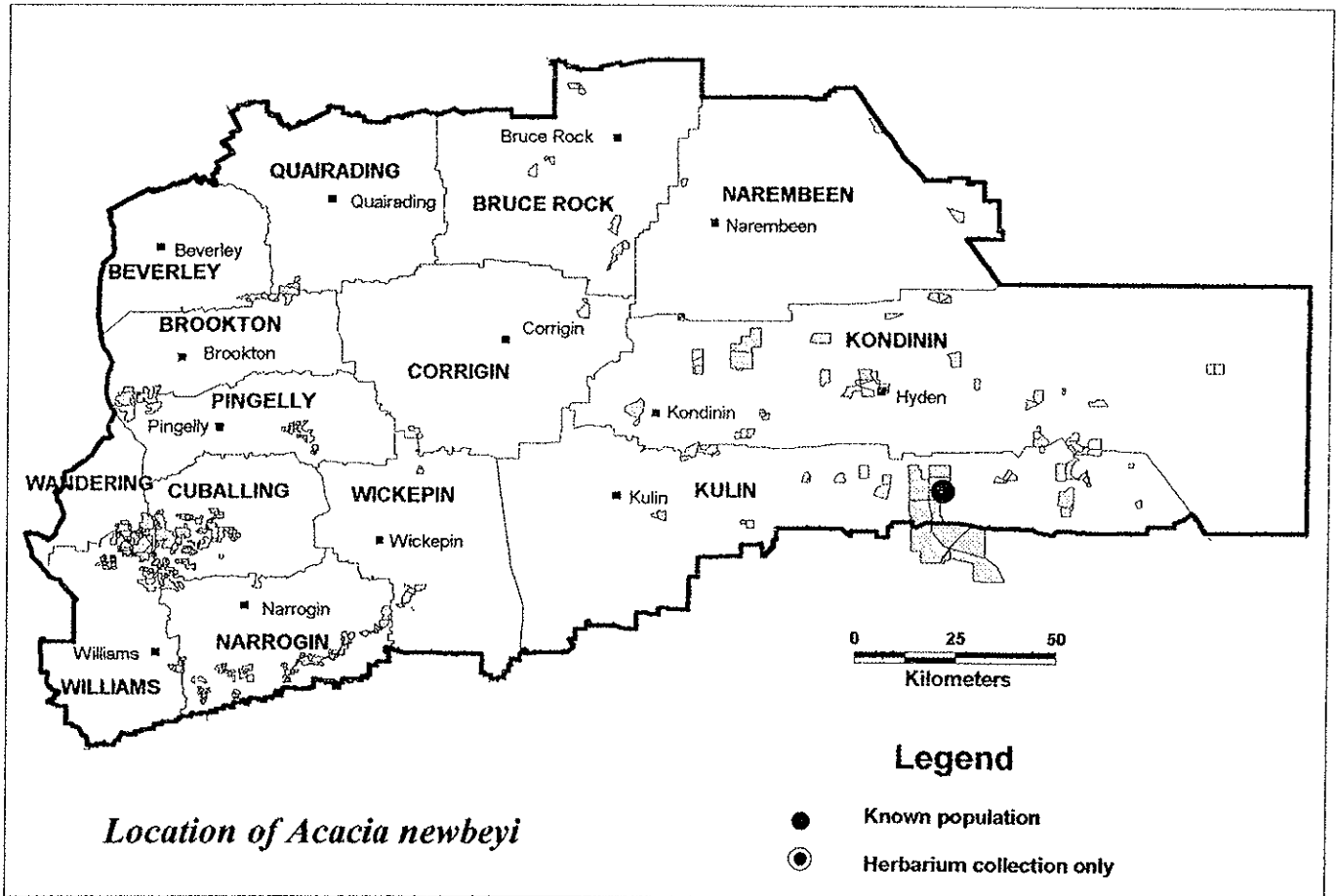
Management Requirements

- Ensure population number 2 is protected from reserve management operations.

Research Requirements

- Survey population 7, confirm numbers and habitat.
- Survey adjacent nature reserve number 20342 that has recently been burnt.

References Maslin (1975).



Acacia obesa Cowan & Maslin ms.

MIMOSACEAE

A. obesa ms. is a spreading, small shrub usually between 0.3-0.6 metres tall with a greyish-whiteness appearance given by the new shoots. The cylindrical branchlets are densely covered with matted hair. The cylindrical, 1.5-2.5 cm long, 1.2-1.8 mm diameter phyllodes are usually shallow to strongly curved but occasionally straight, mostly hairless, with 12-16 raised nerves. The stalkless, 9-14 flowered, 3.5-4 mm diameter, light-golden flower heads are spherical. The 2-4 cm long, 2-2.5 mm wide legumes are strongly recurved, becoming 1-2 coiled after opening. The 1.5-1.8 mm long seeds are glossy with mottled shades of tan. The aril nearly as long as seed. The species name refers to the succulent appearance of the phyllodes.

Flowering period: July - September.

Distribution and Habitat in the Narrogin District

Known from east of Hyden, Lake Grace and Lake King. It inhabits low open woodland, open scrub and open heath in sand and gravelly loam. Geologically, *A. obesa* may occur on white or yellow re-worked sandplain that may contain some lateritic gravel.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|------------------|-------------|-------|-------------|---------------|-----------|
| 3* Hyden | 06/09/66 | Kon | ? | ? | Not known |
| 4* East of Hyden | 14/07/70 | Kon | RVS | ? | Not known |
| 7* Lake Liddelow | 23/07/86 | Kon | NR | ? | Not known |

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

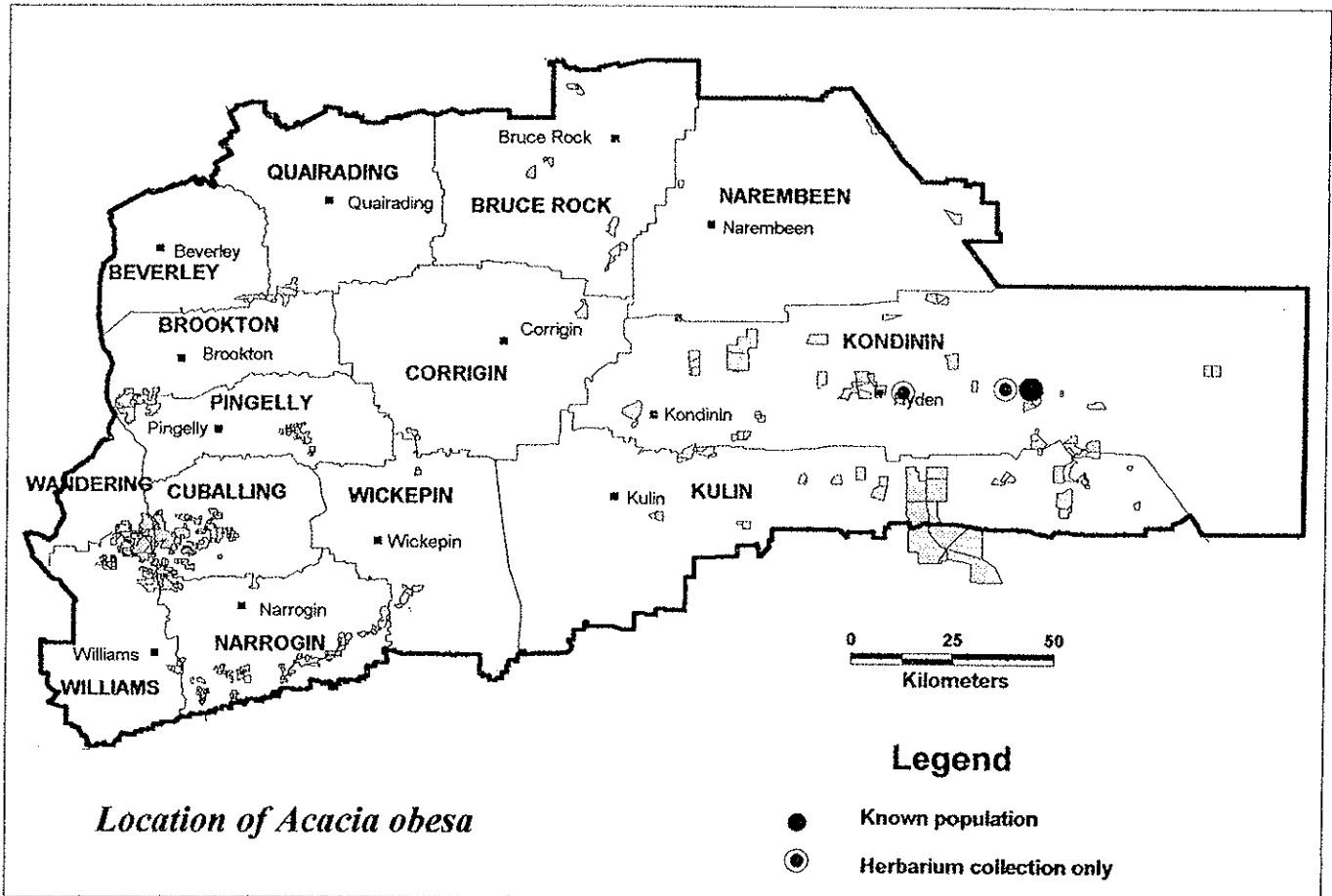
Management Requirements

- Ensure the location of population number 7 is protected during reserve management operations.
- Consider changing status to priority 2.

Research Requirements

- Survey relocate population number 3 and 4.
- Confirm numbers and habitat of population number 7.
- Survey on conservation reserves within known distribution containing similar habitat type.

References Cowan, R.S. & Maslin (personal communication).



Acacia phaeocalyx Maslin

MIMOSACEAE

A compact, entangled, diffuse 0.3-0.6 metre tall shrub. The cylindrical, finely ribbed branches are hairless, brownish in colour, greying with age. The branchlets frequently having a 'bloom' appearance. New shoots are brick red in colour. The spiny stipules are 2-4 mm long and slightly to obviously recurved. The phyllodes are asymmetrical, rigid, leathery, hairless, olive green when dry. 1 Inflorescence per node. The golden yellow flower heads are spherical, with 7-8 loosely arranged flowers. Flowers in 4 parts. The calyx is dark brown.

Flowering period: April - June.

Distribution and Habitat in the Narrogin District

Occurs from Wongan Hills southwards to Kellerberrin and Quairading. It inhabits sand and sand over laterite in heath and open mallee, possibly with *Allocasuarina campestris*.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|------------|-------------|-------|-------------|---------------|-----------|
| Quairading | 25/09/83 | Qua | ? | Occasional | Not known |

Qua Shire of Quairading
* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

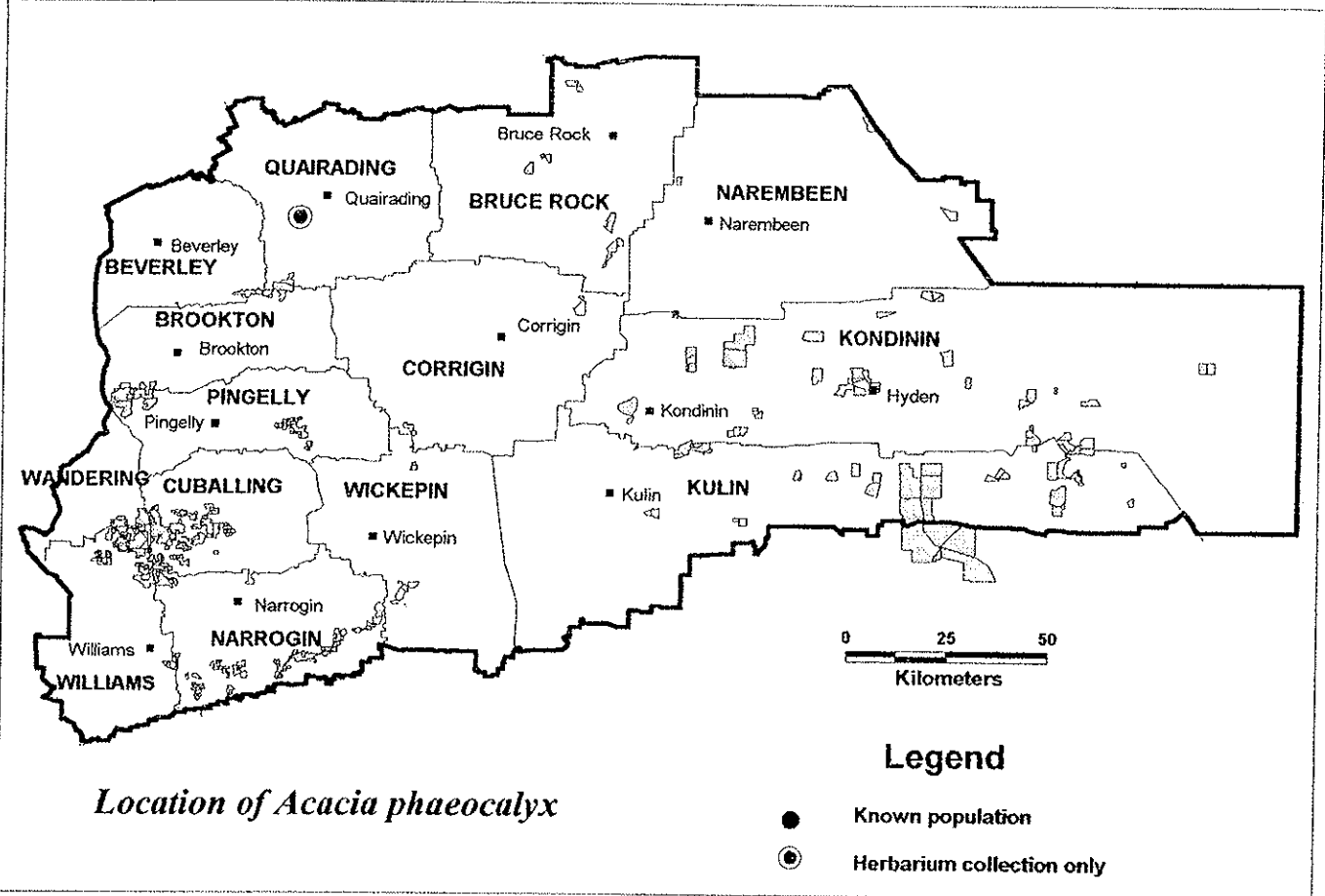
Management Requirements

– Nil.

Research Requirements

- Survey to relocate population number 8.
- Survey opportunistically, for new populations on conservation reserves.

References Maslin (1978).



Acacia repandra Cowan & Maslin ms.

MIMOSACEAE

A 0.5-2 metre tall shrub with 'Minniritchie bark' and more or less ridged branchlets. The 3.5-6 cm long, 1-3 mm wide phyllodes are cylindrical to flat, more or less rigid, spread out widely from the stem to turning upwards, shallowly to moderately incurved, and 8 nerved with 3 nerves per face. When the phyllodes are flat the nerves are strongly raised and often sticky. The 5-8 mm long and 4.5-5 mm diameter, semi-spherical, golden flower heads are stalkless with 2 per axil. and contain 20-25 flowers. There are 5-parts per flower. The strongly wavy, 3 cm long, 4 mm wide legumes are narrowly oblong, raised over the seeds, light golden or with white hairs. Seeds are 2.5-3 mm long, glossy, dark brown-black and obscurely mottled yellow. The manuscript name refers to the curvature of the phyllodes.

Flowering period: July.

Distribution and Habitat in the Narrogin District

All populations except one occur near Lake Hurlstone. The other population is recorded from Wongan Hills. It occurs in gritty sand loam and gravel loam near granite outcrops in heath, scrub and scrubland.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|------------------|-------------|-------|-------------|---------------|-----------|
| 1 Lake Carmody | 19/11/31 | Kon | ? | ? | Not known |
| 2 Rabbit Fence | 21/12/85 | Kon | VCL | Occasional | Not known |
| 3 Kruppa Road | 22/07/89 | Kul | ? | ? | Not known |
| 4 Lake Hurlstone | 22/07/89 | Kul | NR | Common | Not known |
| 5 Kruppa Road | 22/07/89 | Kul | ? | ? | Not known |
| 6 The Pimple | 10/06/86 | Kon | NR | ? | Not known |

Kon Shire of Kondinin

Kul Shire of Kulin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

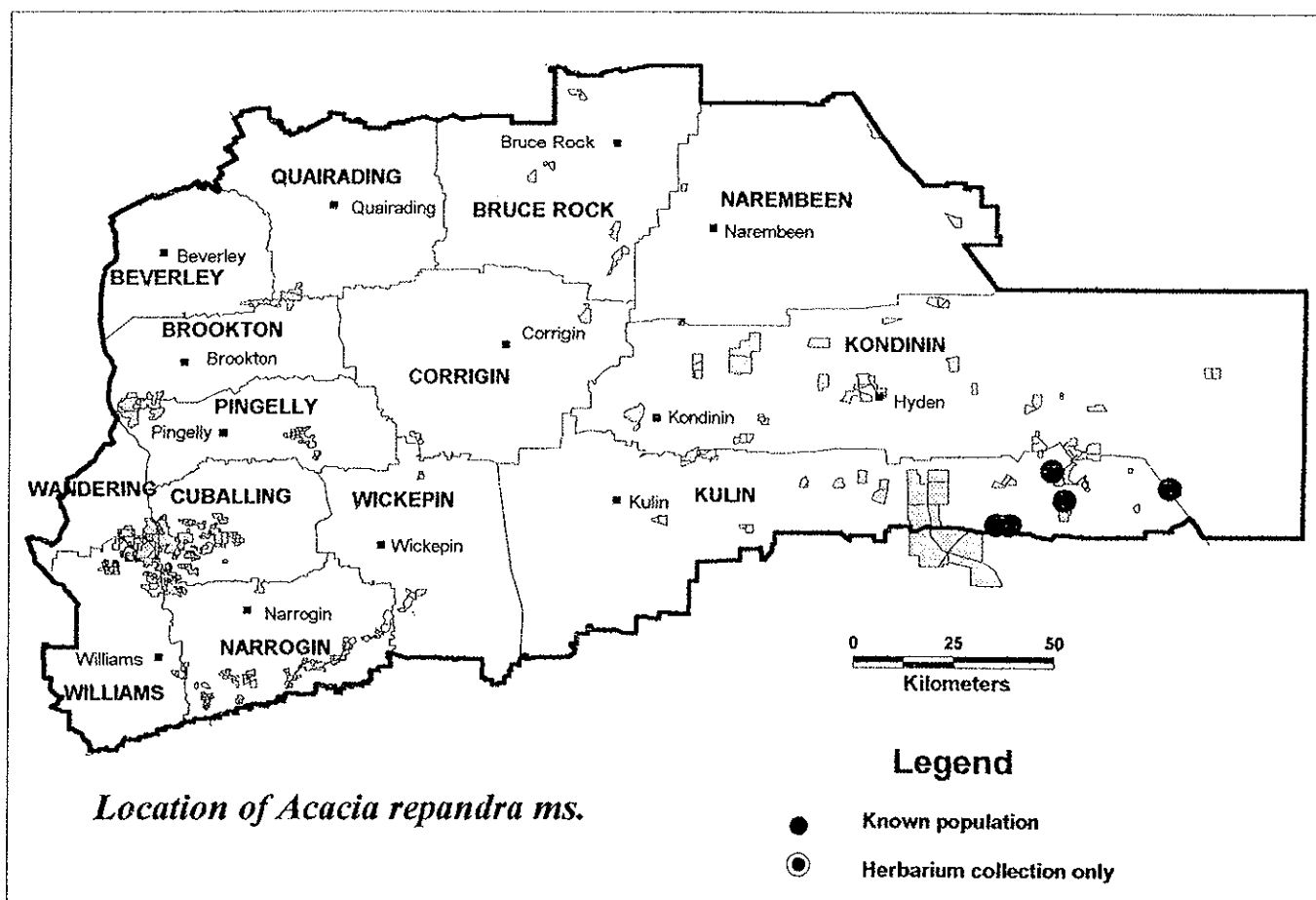
Management Requirements

- Monitor known populations occasionally.

Research Requirements

- Survey opportunistically on conservation reserves with gritty sandy loams near granite exposures.

References Cowan & Maslin (personal communication).



Acacia sedifolia Maiden & Blackely subsp. *pulvinata* Maslin

MIMOSACEAE

A resinous, dense, hairless, 1.5 metre tall and 3 metre rounded shrub with branches which are aromatic when crushed. Phyllodes are seated on raised projections, with a swelling at the base of the phyllode. The 2-5 mm long and 0.5-1.5 mm wide phyllodes are oblong to asymmetrically wedge shaped and narrowed to distinct acute points. They are often crowded, flat, thick, ascending to erect, recurved at least at the apex, green and nerveless. The inflorescence is simple, 1-headed per axil with peduncles 1-7mm long, somewhat stout, with 20-26 light to mid-golden, globular flowers. The sepals are united. The 5cm long and 4.5-5.5 mm wide dry and brittle flat, veined legumes contain 3.5- 5mm long brown- black mottled yellow seeds with thick arils. Differs from subsp. *sedifolia* which does not have phyllodes seated on raised projections. May be related to *A. handonis* which is readily distinguished by its longer phyllodes.

Flowering period: August - November

Distribution and Habitat in the Narrogin District

Known from Karlgarin south to near Newdegate, growing on lateritic hilltops or ridges with sand or clay in open scrub mallee.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-----------------|-------------|-------|-------------|----------------|---------------|
| 1* Dragon Rocks | 10/09/88 | Kon | NR | Locally Abund. | Not known |
| 2* Pederah | 12/08/85 | Kul | ? | ? | In road ditch |

Kon Shire of Kondinin

Kul Shire of Kulin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

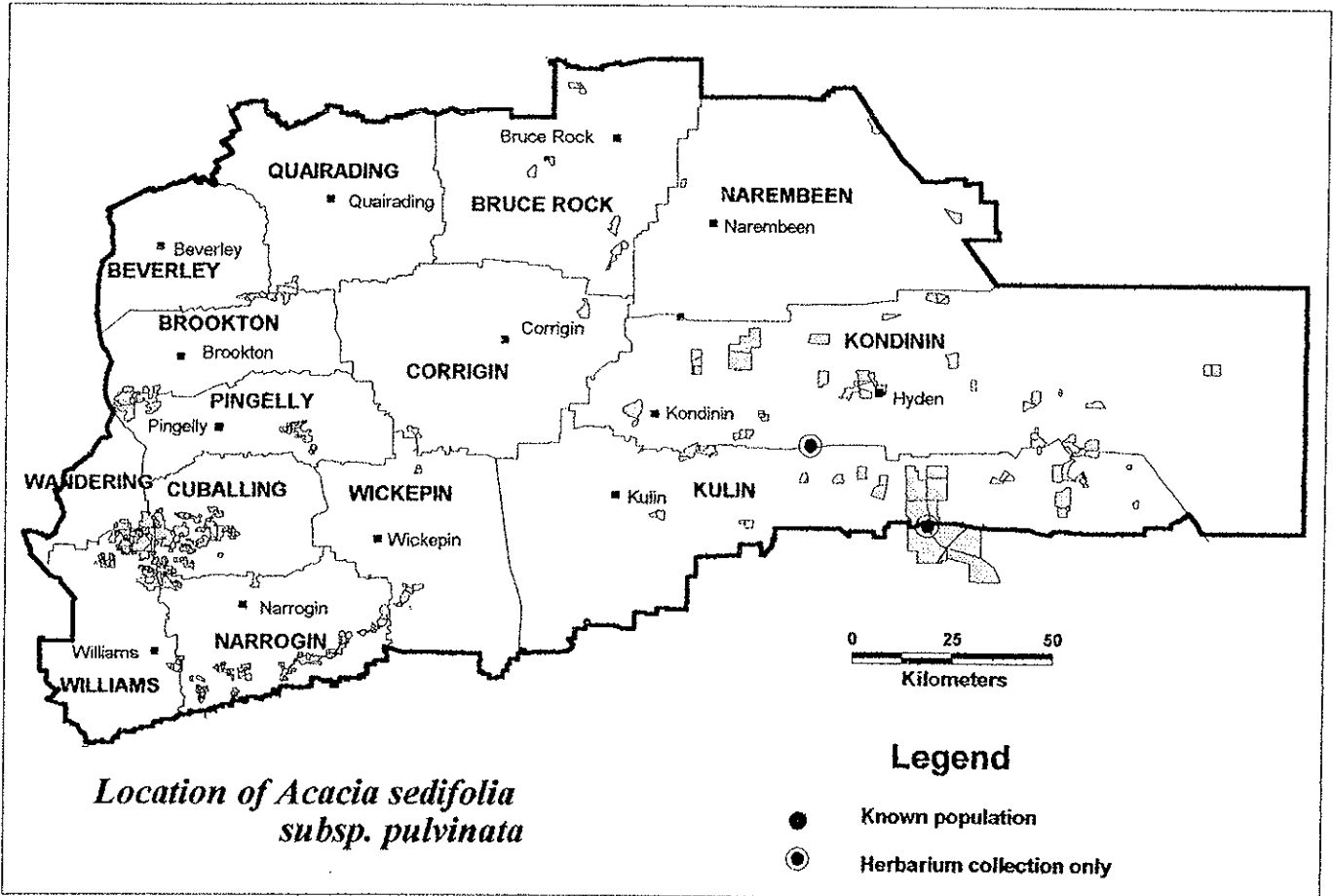
Management Requirements

– Nil until populations relocated.

Research Requirements

- Survey to relocate known populations in the District.
- When relocated survey for new populations on adjacent conservation reserves.

References Maslin (personal communication).



Beaufortia* sp. column (Beard 8119)*MYRTACEAE**

Beaufortia sp. column is a tall shrub to about 1.2 metres tall. The stems are grey in colour and are densely leafy and column like. The leaves are light green in colour, crowded, soft, needle-like and appear in bunches. The flowers are clawed and red or red-green in colour.

It is called the Column *Beaufortia* because the crowded leaf arrangement on the stem gives a column appearance.

Flowering period: September - November

Distribution and Habitat in the Narrogin District

Occurs near Corrigin and is reported to occur in the Brookton area. It grows on laterite gravel and duri-crust ridges in association with heath, scrub heath and thicket vegetation.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-----------------|-------------|-------|-------------|---------------|-----------|
| 1* Pingeculling | 23/09/83 | Bro | NR | ? | Unknown. |
| 2 *Weam | 23/09/83 | Bro | NR | ? | Unknown. |
| 3 Corrigin | 03/11/83 | Cor | WAR | Common | Healthy |
| 4* Brookton | 07/06/84 | Bro | ? | ? | Unknown. |
| 5* Bilbarin | 18/10/61 | Bev | ? | ? | Unknown. |

Bro Shire of Brookton

Cor Shire of Corrigin

Bev Shire of Beverley

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

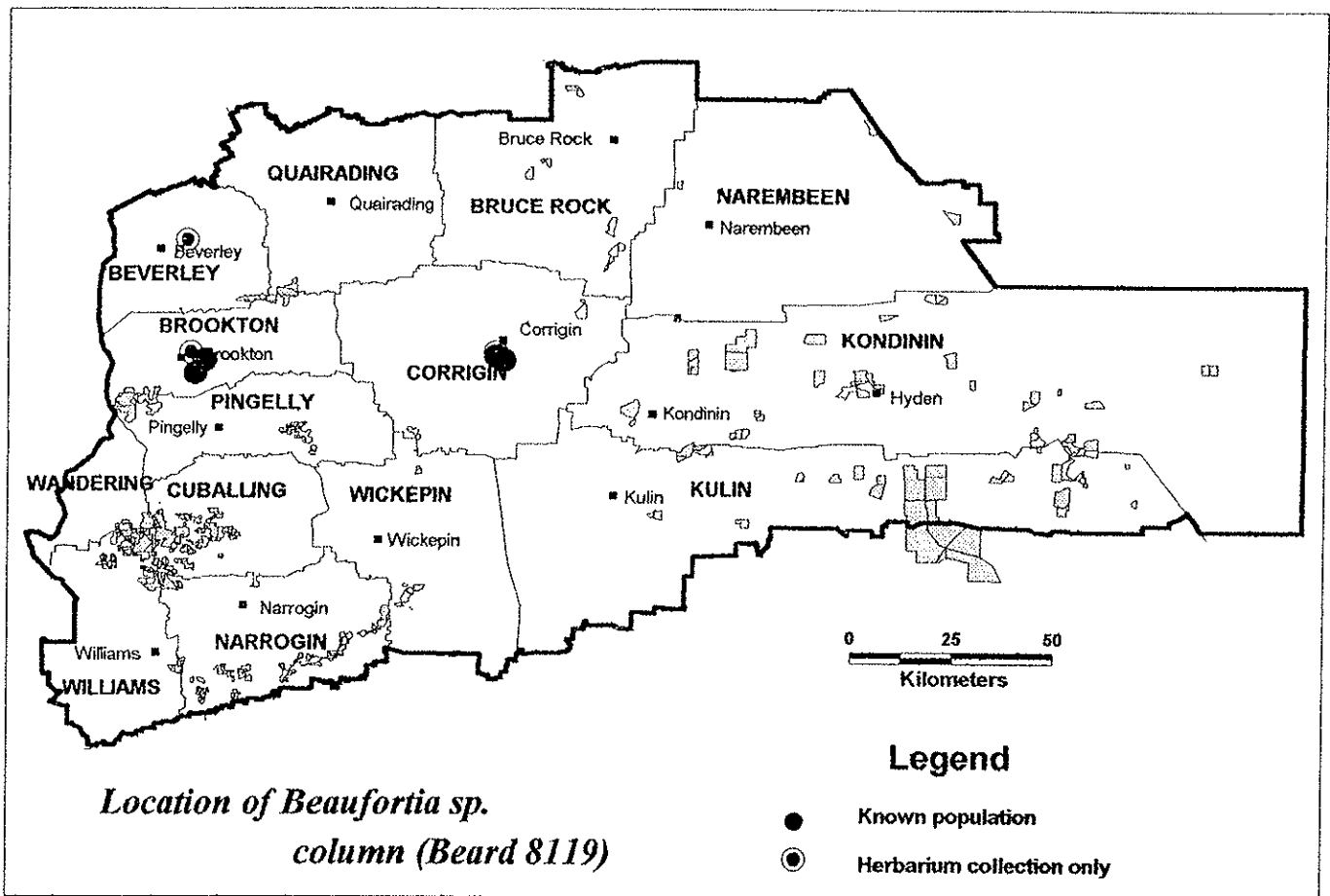
Management Requirements

- Monitor known population occasionally.

Research Requirements

- Survey for new populations especially the location of population 1, 2, 4 and 5.

References



Calytrix nematoclada Craven

MYRTACEAE

A shrub to 45 cm tall with hairy branchlets. The leaves are opposite and successive pairs occur at right angles to each other. Each leaf pair may be overlapping or widely spaced and closely pressed on stem to spreading and turned upwards. The petiole is absent. The leaf blade is covered with silky hair. The leaf margin often has longer hairs. One to several flowers form the flower cluster which are scattered. The 2.5-3.5 mm long hypanthium is hairy and 10-ribbed. The purple or deep pink petals are hairless, 5-6.5 mm long and 1.3-1.5 mm wide. The species name refers to the thread-like branchlets of this species.

Flowering period: September - January.

Distribution and Habitat in the Narrogin District

Known from seven locations from Ravensthorpe - Lake King area, southwest near Pingrup and northwards to near Bending. It may be found growing in heath vegetation with *Actinostrobus* on yellow sand, with *Eucalyptus tetragona* and low scrub on sand over laterite, and with *E. incrassata* in tall-open shrubland on well drained deep sand over clay.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|------------|-------------|----------|-------------|---------------|-----------|
| 1* Bending | 30/11/62 | Kondinin | ? | ? | Lullfitz |

Kon Shire of Kondinin
* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

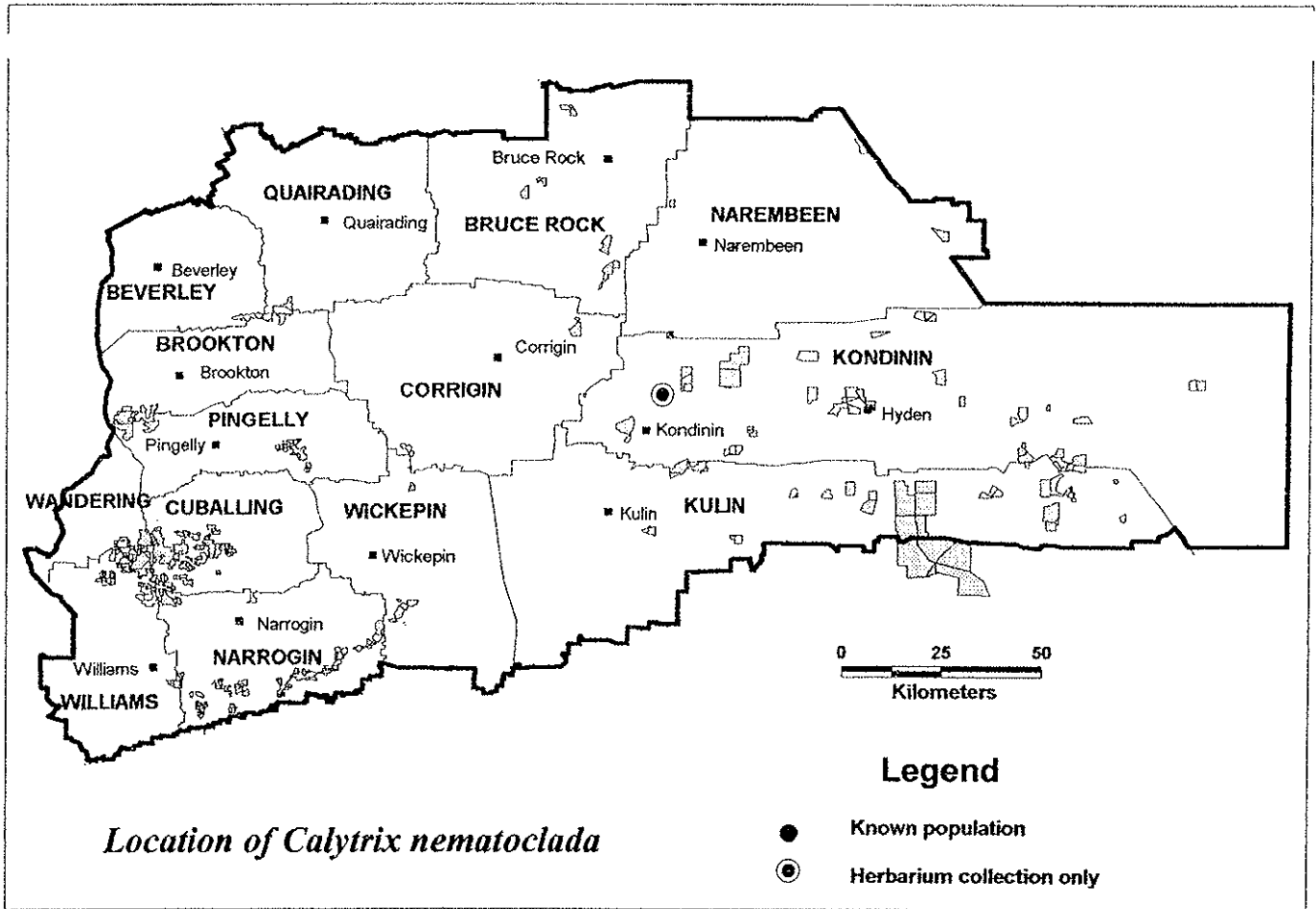
Management Requirements

- Nil.

Research Requirements

- Attempt to relocate population number one and survey for new populations on the sandy portion of the Bending Nature Reserve and other conservation reserves south of Bending Nature Reserve.

References Craven (1987).



Chorizandra multiarticulata Nees

CYPERACEAE

A small to medium sized, up to 60 cm high, perennial herb with jointed stems and fine longitudinal ribs. The leaves increase in size from base upward, the lower leaves are loose sheath with a small pointed blade, the upper most leaves are sometimes stem-like. The flower clusters are dense, about 10 mm in diameter. The whorl of bracts are glossy, dark-coloured, dry, and scaly. The anthers are 3 mm long. The genus refers to the separate male flowers with the species name referring to the many joints of the stem.

Flowering period: August - November, ? January.

Distribution and Habitat in the Narrogin District

Widely distributed from near Midland to Ravensthorpe. Other populations occur at Duranillin, Arthur River and in the Dryandra State Forest and the Tutanning Nature Reserve. Its habitat is damp areas, winter wet depressions and alluvial drainage lines. At Duranillin it occurs in low open heath vegetation.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-------------|-------------|-------|-------------|---------------|-----------|
| 2 Tutanning | 11/01/92 | Pin | NR | ? | Not known |
| 4 Dryandra | 07/09/83 | Cub | SF | Common | Not Known |

Pin Shire of Pingelly

Cub Shire of Cuballing

* population known only as Herbarium record

Response to Disturbance

Given its preference to wet depressions, populations occurring in areas subject to increasing salinity may be at risk.

Susceptibility to *Phytophthora* Dieback

Unknown.

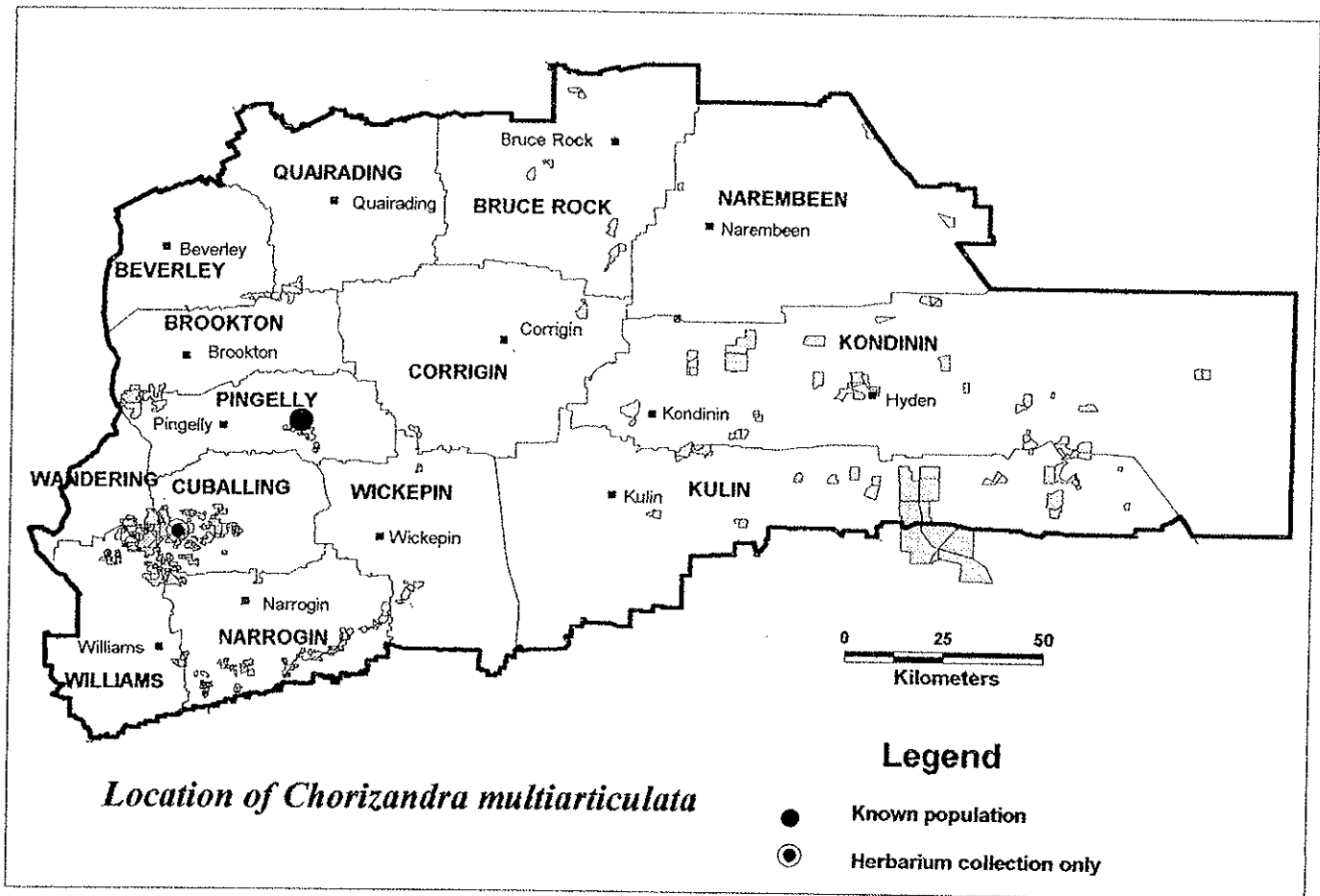
Management Requirements

- Protect population number 2 and 4 from reserve and forest management operations.

Research Requirements

- Survey population number 2 and 4 to establish numbers and habitat details.

References Marchant, *et. al.* (1982). Leigh, Briggs, & Hartley (1984), Ness (Undated).



Conospermum eatoniae Pritzel

PROTEACEAE

A dense, spreading, leafless, 1 metre tall by 2 metre wide blue flowering smoke bush shrub. The branches are divided in a uniform but complex manner. The flowers may be shiny, pinkish, blue and deep blue. Bracts are pink and blue.

Flowering period: August - October.

Distribution and Habitat in the Narrogin District

Known from west of Coorow and Watheroo to Goomalling, Kellerberrin and Tammin, southwards to Quairading and east north-east of Brookton. It inhabits sand and sandy loam and in at least one location occurs on dune sand. It may be found growing in low woodland of *Banksia*, *Jacksonia* sp. *Acacia* sp. and *Hibbertia* sp.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|---------------|-------------|-------|-------------|---------------|--------------------|
| 7* Quairading | 10/1933 | Qua | ? | ? | Not known |
| 10 McCooke | 18/08/94 | Bro | PP | 2 | In cleared paddock |
| 11 Sudholz | 12/10/94 | Bro | PP | 30 | Near lake, Healthy |

Qua Shire of Quairading

Bro- Shire of Brookton

* population known only as Herbarium record

Response to Disturbance

Appears to favour mechanically disturbed sites. Population number 10 is located in a previously cleared paddock.

Susceptibility to *Phytophthora* Dieback

Presumed susceptible.

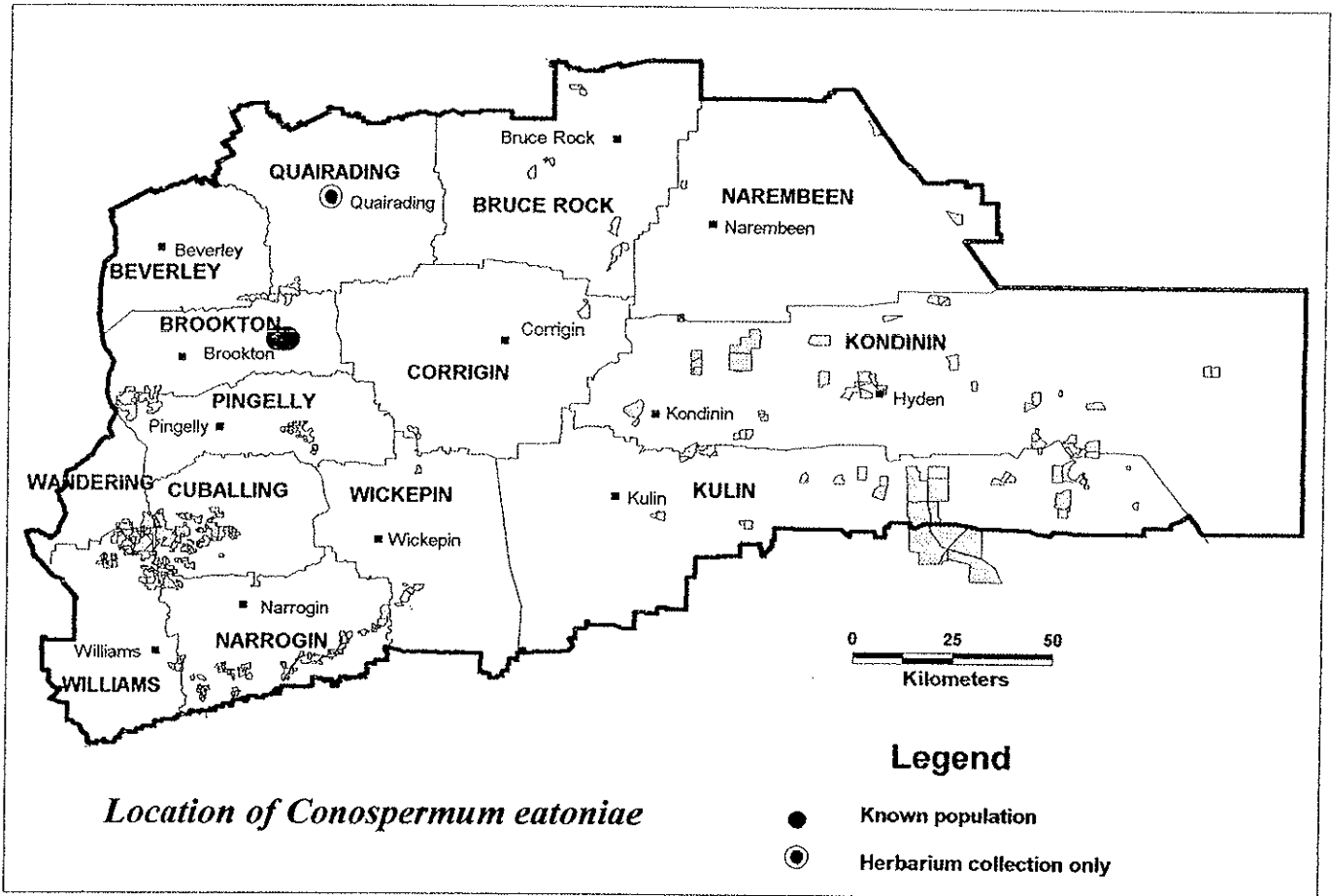
Management Requirements

– Monitor known populations occasionally.

Research Requirements

- Survey opportunistically for new populations on conservation reserves, on yellow-white sand or dune sand, between Brookton to Corrigin, northwards to Quairading and southwards to Yealering.

References Pritzel (1904).



***Daviesia uncinata* Crisp ms.**

PAPILIONACEAE

An entangled, multi-stemmed, pea flowering, 0.7 metre tall and 1 metre wide shrub. It is mid-dense, almost domed shaped with zigzagging branchlets. The 5-70 mm wide and 1-2 mm long, scattered phyllodes have hooked tips, to which the manuscript name refers, and these are dull medium green, curved upward, flattened - cylindrical,, with parallel grooves or ridges. The flower cluster is 1-7 mm long. The flower stalk 1-1.5 mm long. Pinkish red corolla wings are 6 mm long. The hooked keel about 6 mm long, pinkish red with a black tip. Style is hooked. Aril is well-developed.

Flowering period: November - January.

Distribution and Habitat in the Narrogin District

Has a wide distribution, occurring from near Tammin to east of Newdegate. In the Narrogin District it is recorded from three locations, at Yoting, near Lake Mears and east of Dragon Rocks Nature Reserve. It occurs in sand and sand over laterite in low and tall heath, frequently with *Allocasuarina campestris*. It may favour disturbed sites.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-------------------------|-------------|-------|-------------------|---------------|-----------|
| 2* Yoting | 27/01/79 | Qua | SR (Refuse site.) | Loc. Common | Not Known |
| 4* Lake Mears | 27/09/79 | Bro | ? | Common | Not Known |
| 5* East of Dragon Rocks | 29/01/79 | Kul | ? | Common | Not Known |

Qua Shire of Quairading
 Bro Shire of Brookton
 Kul Shire of Kulin
 * population known only as Herbarium record

Response to Disturbance

May respond favourably to disturbance.

Susceptibility to *Phytophthora* Dieback

Unknown.

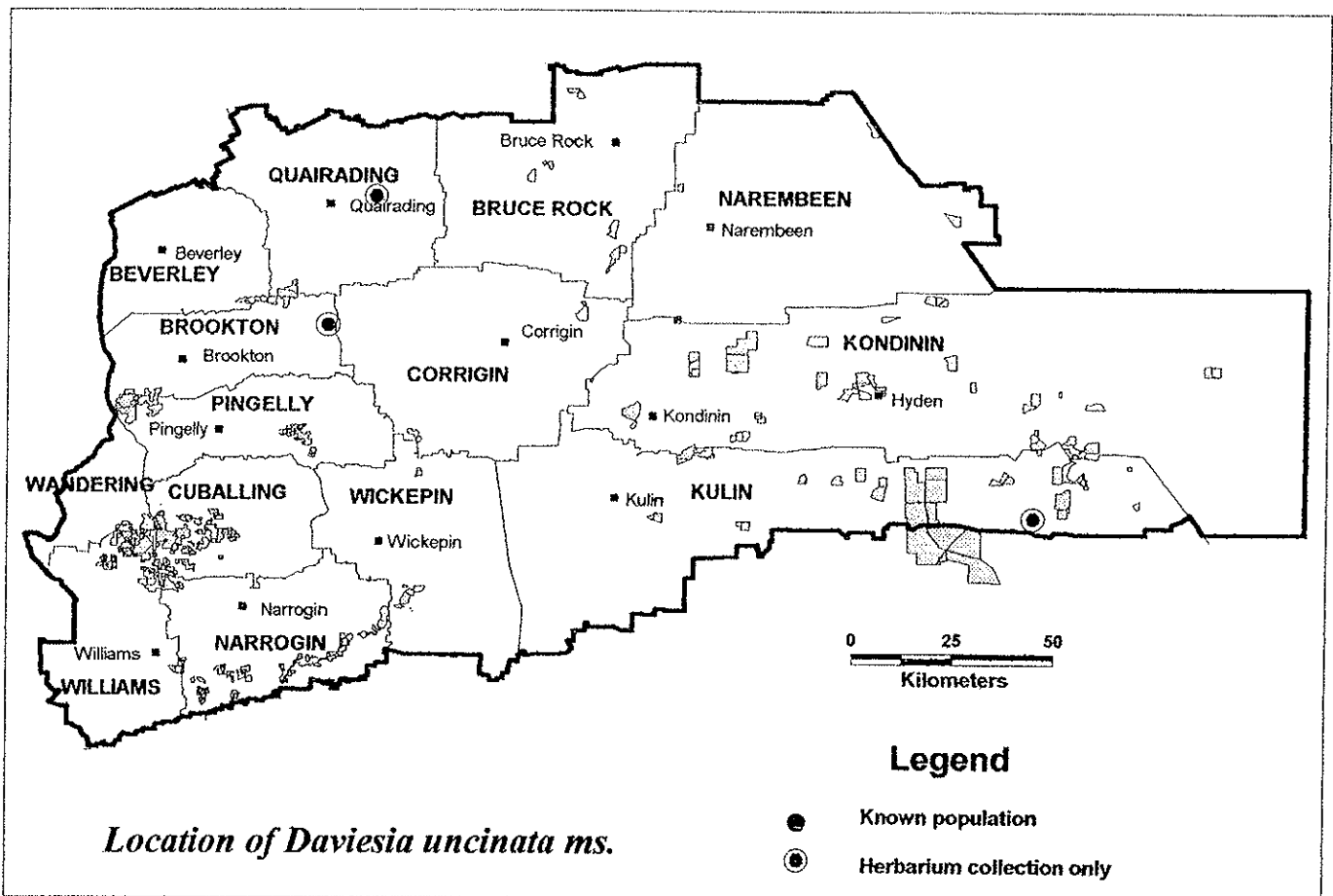
Management Requirements

- Consider a change of status to priority 2, after surveys are completed.

Research Requirements

- Survey to relocate population number 2, 4 and 5. Population 2 should be easy to relocate.
- Survey opportunistically, on conservation reserves with similar habitat, especially Dragon Rocks Nature Reserve and surrounding reserves.

References Crisp, M.D.(in prep).



Dryandra horrida Meissner

PROTEACEAE

An open shrub to 2 metre high and 1 metre wide with long stems covered in coarse and stiff hairs. The branches are thick, densely covered with fine hairs, the surface whitish or of greyish hue. The narrow, rigid, 4-14 cm long and 5-10 mm wide leaves are prickly. The leaf lobes are cut deeply with long, stiff, sharp points, about 1 cm, with the midrib prominent on the undersurface. There are 5-12 teeth each side of the leaf. They are narrow, unequal sided triangles, pointed, to 4 mm long. The 6-7 mm long floral bracts are linear with long, coarse, stiff hairs. There are 35-50 flowers per head. The perianth is straight, 24-32 mm long, hairy above base, hairless in upper half. The limb is 5-6 mm long. The pistil straight, 23-31 mm long. The 3 mm long pollen presenter is narrow. The species name refers to its shaggy, bristly, prickly and very thorny appearance.

Flowering period: March - June.

Distribution and Habitat in the Narrogin District

Known from near Goomalling east to near Moorine Rock and south to near Kondinin. It occurs on sand and gravelly sand soils with *Allocasuarina* sp., *Banksia prionotes*, *Dryandra* sp. and *Xylomelum* scrub. It may be relatively common in the District because its preferred habitat is not uncommon.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|--------------|-------------|-------|-------------|---------------|-----------|
| 2* Narembeen | 09/1929 | Nar | ? | ? | Blackall |
| 3* Babakin | 26/05/66 | Cor | ? | ? | George |
| 4* Lomos | 28/03/65 | Cor | ? | ? | Newbey |
| 9* Yoting | 22/10/64 | Qua | ? | ? | Newbey |
| 11* Koorikin | 02/89 | Kon | RVM | ? | Beaton |

Nar Shire of Narembeen

Cor Shire of Corrigin

Qua Shire of Quairading

Kon Shire of Quairading

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown. However, presumed susceptible.

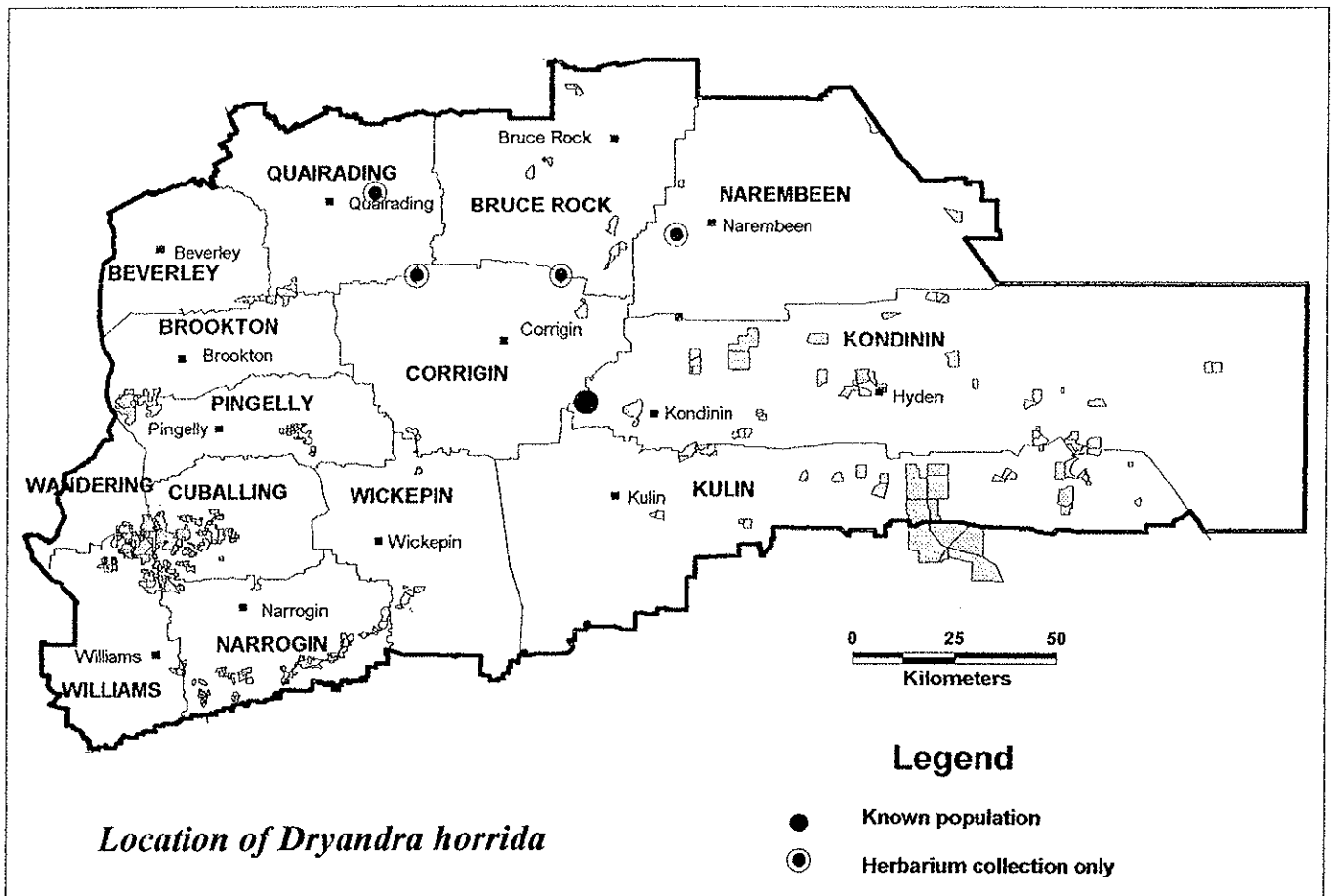
Management Requirements

- Nil until populations confirmed.

Research Requirements

- Confirm the location and plant numbers for each population known in the Narrogin District.

References George (personal communication), Sainsbury(1985), Blackall and Grieve (1988).



Dryandra subpinnatifida (Gardner) George

PROTEACEAE

A shrub to 1.6 m without a lignotuber. The 5-35 cm long and 2-16 mm wide leaves are linear or almost so, broadening upwards, with 8 mm wide leaf lobes usually in lower third to half. About 15 leaf lobes occur on each side. They are widely spaced, narrowly triangular, lowest ones spine like and the margins recurved. The crowded flower cluster occurs on short lateral branchlets, There are about 40 flowers per head. The involucral bracts are to 20 mm long. The pistil 37-39 mm long. The limb 3.2-3.7 mm long, densely hairy with longer hairs towards the apex. The pollen presenter is 1-1.2 mm long, cylindrical to narrow-oval, noticeably thickened at base. The golden perianth is 27-28 mm long, curled-woolly above the base, hairless inside. The species name refers to the leaf lobes only occurring on the lower half of the leaf.

Flowering period: July - August.

Distribution and Habitat in the Narrogin District

Known only from the Narrogin District from west of Pingelly and Popanyinning to Dryandra and Narrogin. It is found in gravelly loam on laterite rises in scrub with other *Dryandra* and *Eucalyptus drummondii*. It seems to grow in isolation among the thick scrub.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|-------------------------|-------------|-----------|-------------|---------------|------------------|
| 1* West of Popanyinning | 23/11/64 | Cuballing | ? | ? | Lullfitz |
| 2* West of Pingelly | 01/12/62 | Pingelly | ? | ? | Lullfitz |
| 3* Dryandra | 04/10/94 | Cuballing | SF | 1 | Rose and Buehrig |
| 4* Narrogin | 10/1944 | Narrogin | ? | ? | Milesi |

Cub Shire of Cuballing

Pin Shire of Pingelly

Nar Shire of Narrogin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown. However, presumed susceptible.

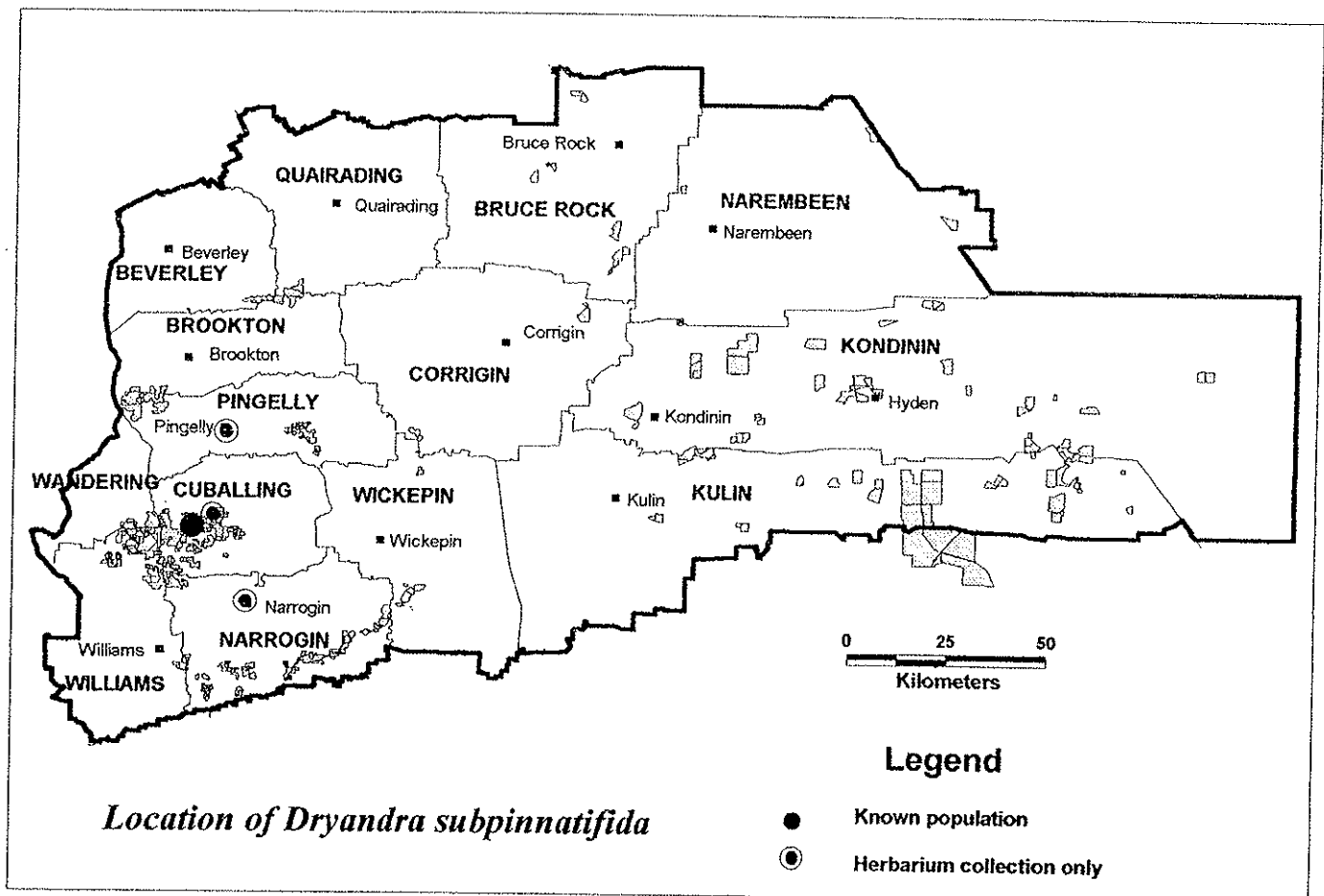
Management Requirements

- Ensure population number 4 is protected during forest management operations.

Research Requirements

- Undertake surveys to relocate population number 1, 2 and 3. Survey for new populations.

References George (personal communication), Gardner, (1964).



Dryandra viscida. George ms.

PROTEACEAE

A dense rounded *Dryandra* shrub to 1 metre tall without a lignotuber. The stems have coarse hairs and many leaves. The 15-35 cm long and 5-10 mm wide prickly leaves are long and narrow, with lobes cut half-way to midrib and ending in sharp points. Rusty coloured matted hairs occur in pits below. The leaf margins are rolled back toward midrib. The flower clusters are close together and occur at the end of the branch. The golden yellow flowers number about 55 per head. The 9-10 mm sticky bracts are sharp with some long coarse hairs. They are enlarged to 30 mm on the fruit. The 55 mm long perianth is straight with coarse hairs above base. The 55 mm pistil is straight or gently bowed.

Flowering period: August - October.

Distribution and Habitat in the Narrogin District

Known from the Forrestania region at Middle Ironcap, South Ironcap and Hatter Hill Trig Station. It grows in thick scrub and mallee heath with *Allocasuarina* sp., *Calothamnus* sp., *Acacia* sp., and *Melaleuca* sp. It is likely this species occurs on ironstone formations at Middle and South Ironcap. At Hatter Hill it may occur over heavy, dark rock - mafic amphibolite.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|-------------------|-------------|-------|-------------|---------------|-----------|
| 2* Middle Ironcap | 02/10/86 | Kon | ? | ? | Alcock |
| 3* South Ironcap | 08/07/79 | Kon | ? | Frequent | Newbey |

Kon Shire of Kondinin
* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown. Presumed susceptible.

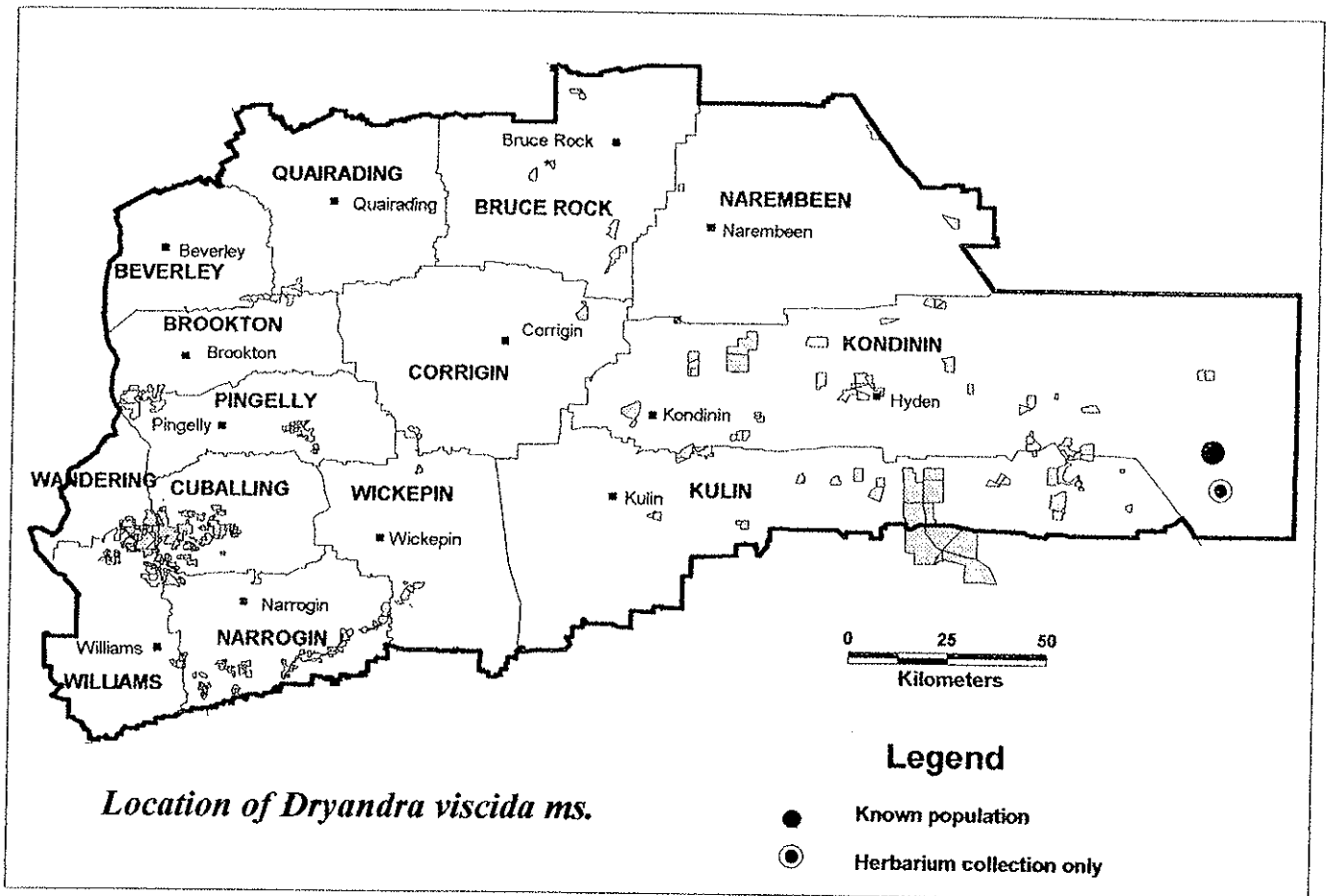
Management Requirements

- Nil until populations relocated.

Research Requirements

- Survey to relocate the South and Middle Ironcap population.

References George (personal communication).



Eucalyptus exigua Brooker & Hopper

MYRTACEAE

E. exigua is an erect, smooth barked mallee about 3.5 metre tall. The 70mm x 40mm juvenile leaves are ovate, grey green in colour with a pale bluish-tint. The adult lance shaped leaves are 60-110mm x 8-19mm and glossy light-green. The flower head consists of up to 11 flower buds, The flowers are white. The 7-19 mm long peduncle is rounded. The operculum is very short with a constriction at the join of the operculum and the hypanthium. The fruit is cup-shaped.

Related to *E. brachycorys*, differing in the lower stature, smooth bark, smaller buds and fruit, very short operculum and the south - eastern distribution.

Flowering period: February. Other flowering months not known.

Distribution and Habitat in the Narrogin District

Most of the known populations of *E. exigua* occur in an area from Lake Cronin to the Middle Ironcap. There is one population away from the Narrogin District, 50 kilometres north east on the Norseman track. It may be found occurring in sand or sandy loam sometimes on colluvial flats in open mallee shrub and heath.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|------------------------------|-------------|-------|-------------|---------------|-----------|
| 1* East of Lake Cronin | 03/10/75 | Kon | VCL | ? | Brooker |
| 2* North east of Lake Cronin | 03/09/86 | Kon | VCL | ? | Hopper |
| 4* South of Lake Cronin | 22/07/88 | Kon | VCL | ? | Brooker |
| 5* Middle Ironcap | 1992 | Kon | VCL | ? | ? |

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

Presumed to regenerate by seed or re-sprouting from rootstock following fire.

Susceptibility to *Phytophthora* Dieback

Unknown.

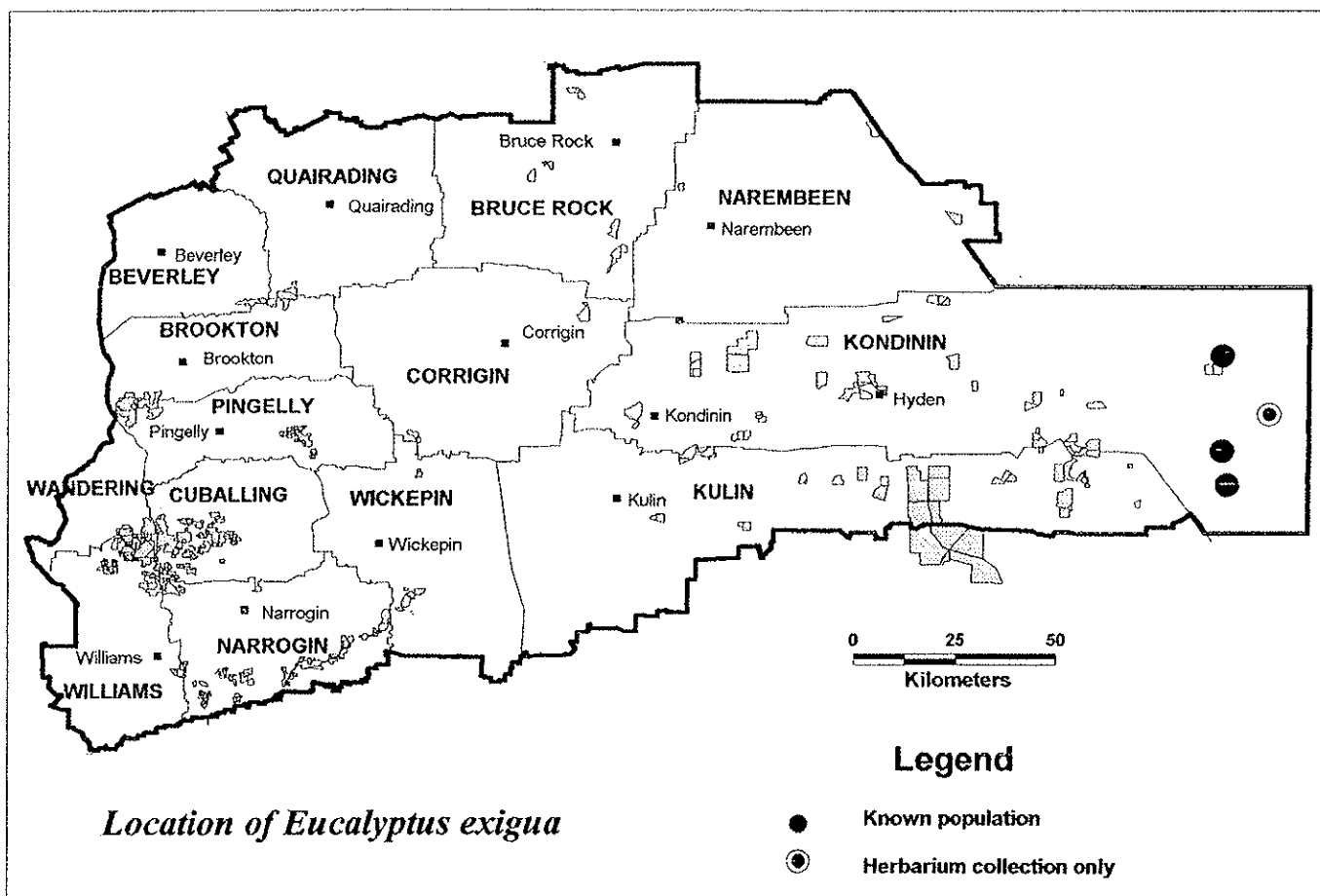
Management Requirements

- Monitor known populations occasionally. Investigate the threat by mining operations.

Research Requirements

- Survey opportunistically and record all new populations located.

References Brooker and Kleinig, (1990).



Frankenia drummondii Bentham

FRANKENIACEAE

F. drummondii is a small prostrate, compact or occasionally spreading shrub. The stems are hairless or shaggy with hairs. The nodes are closely spaced. The 2.5-5 mm long and 1 mm wide leaves are long and narrow, shining and with translucent or coloured dots on the upper surface, with white hairs below and the leaf margins are recurved and usually cover the midrib. The petiole is fringed with hair. The flowers occur in a short two branched array. The bracts and bracteoles are similar to the leaves. The 3.8-5.7 mm long calyx is tubular and mostly hairless outside. There are 5 white, narrow, 8-10 mm long petals. 6 stamens. Anthers are red. The style 3-branched.

Flowering period: November.

Distribution and Habitat in the Narrogin District

Occurs from Wave Rock to south east of Lake King and north east to Lake Johnson. Little is known of the habitat of this plant. It appears to favour granite rock outcrops.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|--------------|-------------|-------|-------------|---------------|-----------|
| 1 Hyden Rock | 08/12/64 | Kon | ? | ? | Lullfitz |

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

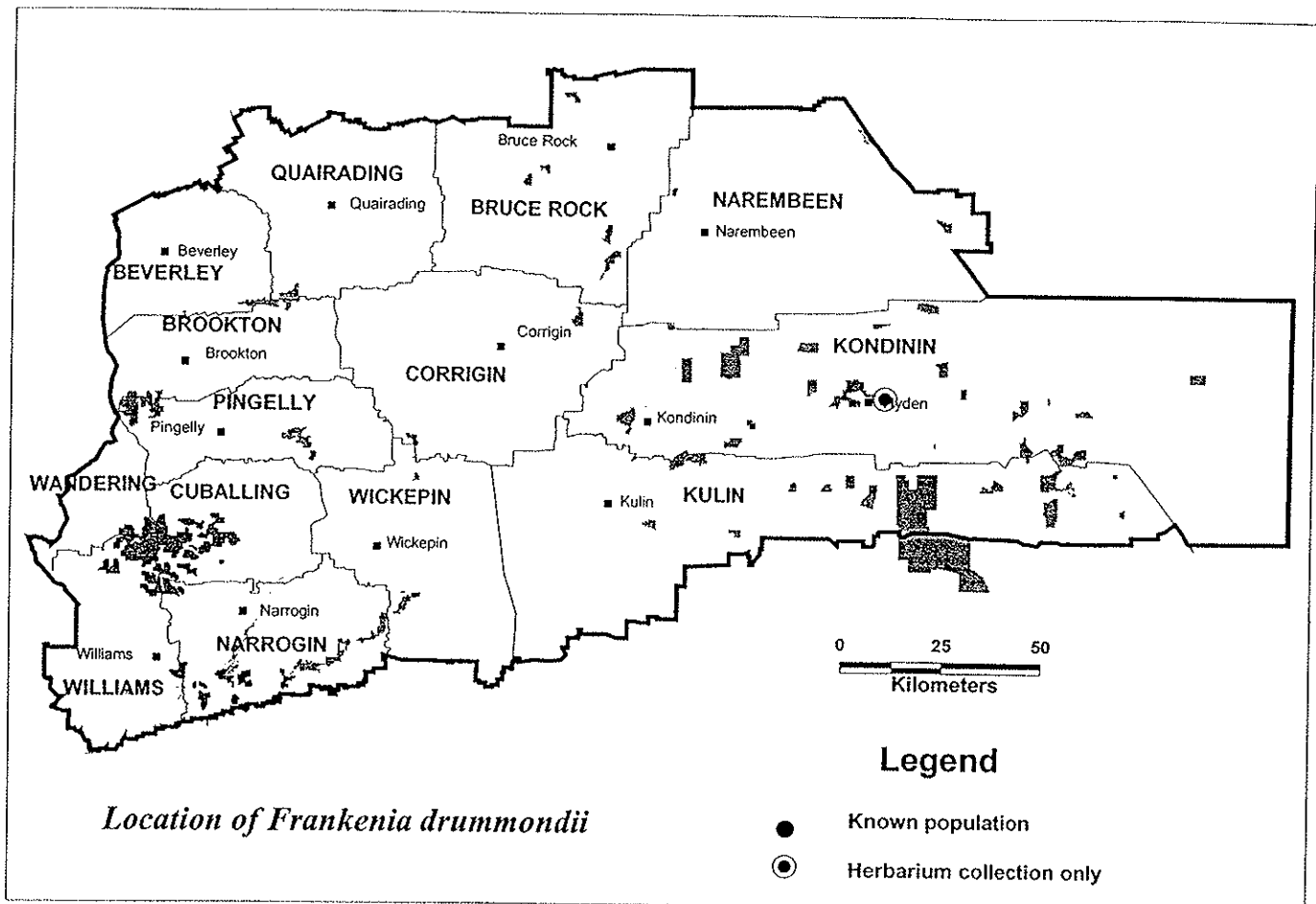
Management Requirements

- Consider a change of status to Priority two.

Research Requirements

- Survey to relocate population number 1.
- Survey to locate new populations in its known range. An idea of the preferred habitat may be obtained from George (10479) where it was recorded from the "Western end of One Mile Rocks Reserve, south east of Lake King."

References Bentham, (1863).



Gastrolobium stenophyllum Turcz.

PAPILIONACEAE

The Narrow-Leaf Poison is a low and spreading or erect 1.8-2.4 metre tall pea flowering shrub with dense foliage and leaves in opposite pairs. The 3 narrow leaves occur in whorls or are irregularly arranged in groups of 2 or 3. They are crowded on the stem. In the Shackleton district they are greyish green, deeply concave and folded lengthwise, blunt at the tips, with a fine point that is sometimes prickly. The stipules are slender. The flowers deep yellow. The racemes loosely arranged and long. There are three forms of *G. stenophyllum*, from the Fitzgerald River, Phillips Range and the Shackleton District. They may prove to be three different taxa.

Flowering period: October - November.

Distribution and Habitat in the Narrogin District

The Shackleton form extends from Shackleton to Doodlakine and Narembeen. Its habitat is obscure however one collection (Locke '74) appears to have been collected on a drainage line at the contact of colluvium and alluvium.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|---------------|-------------|-------|-------------|---------------|-----------|
| 1* Bruce Rock | 19/09/74 | Bru | ? | ? | Locke |

Bru Shire of Bruce Rock

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

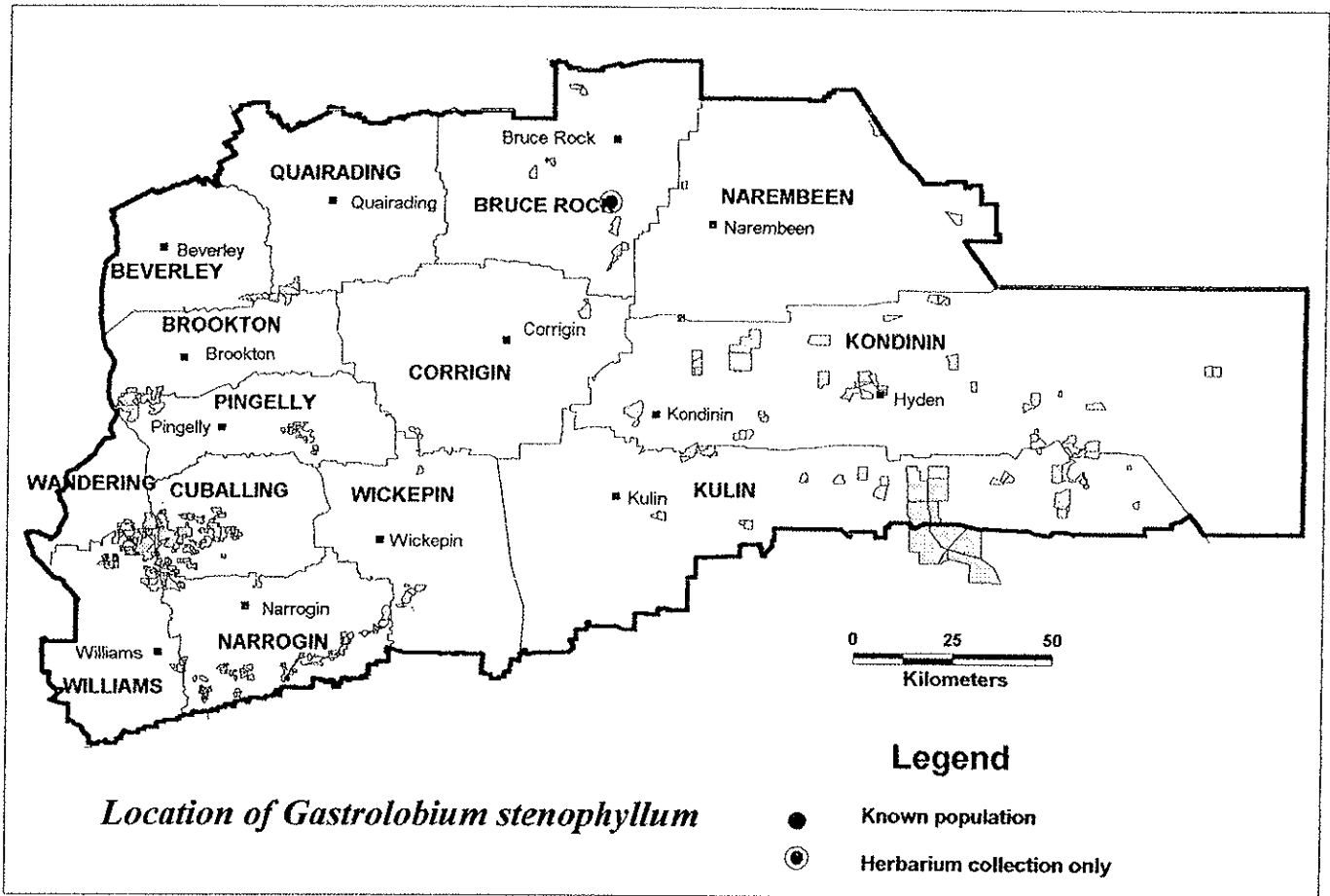
Management Requirements

– Nil until populations relocated in the District.

Research Requirements

- Survey for new populations on conservation reserves in the Narembeen area on the fringes between colluvial/alluvial soils.
- Determine the taxonomy of the three forms and assess conservation status.

References Sampson, & Hopper, (1990).



Grevillea insignis subsp. *elliottii* Olde & Marriott

PROTEACEAE

A bushy shrub that is 2-3 metres wide with non-glaucous branches and holly shaped leaves. Ovate to oblong leaves are 3-6 cm long, green, not the same colour throughout, papery to leathery in texture, the leaf base wedge-shaped. The perianth is cream turning rose-pink, the style is rose pink, the pistil is 1-17 mm long.

Flowering period: Winter - Summer.

Distribution and Habitat in the Narrogin District

A grevillea with a fairly restricted distribution from east of Varley, between Hatters Hill and Middle Ironcap. It grows in well-drained, densely laterised / ironstone hilltops or rises, in eucalypt woodland, or medium scrub, in association with *Acacia acuminata*, *Grevillea*, *Allocasuarina* and emergent *Codonocarpus*.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|---|-------------|-------|-------------|---------------|-----------|
| 1* Middle Ironcap and other unvouchered populations reported in the area. | 20/10/87 | Kon | VCL | ? | Not Known |

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

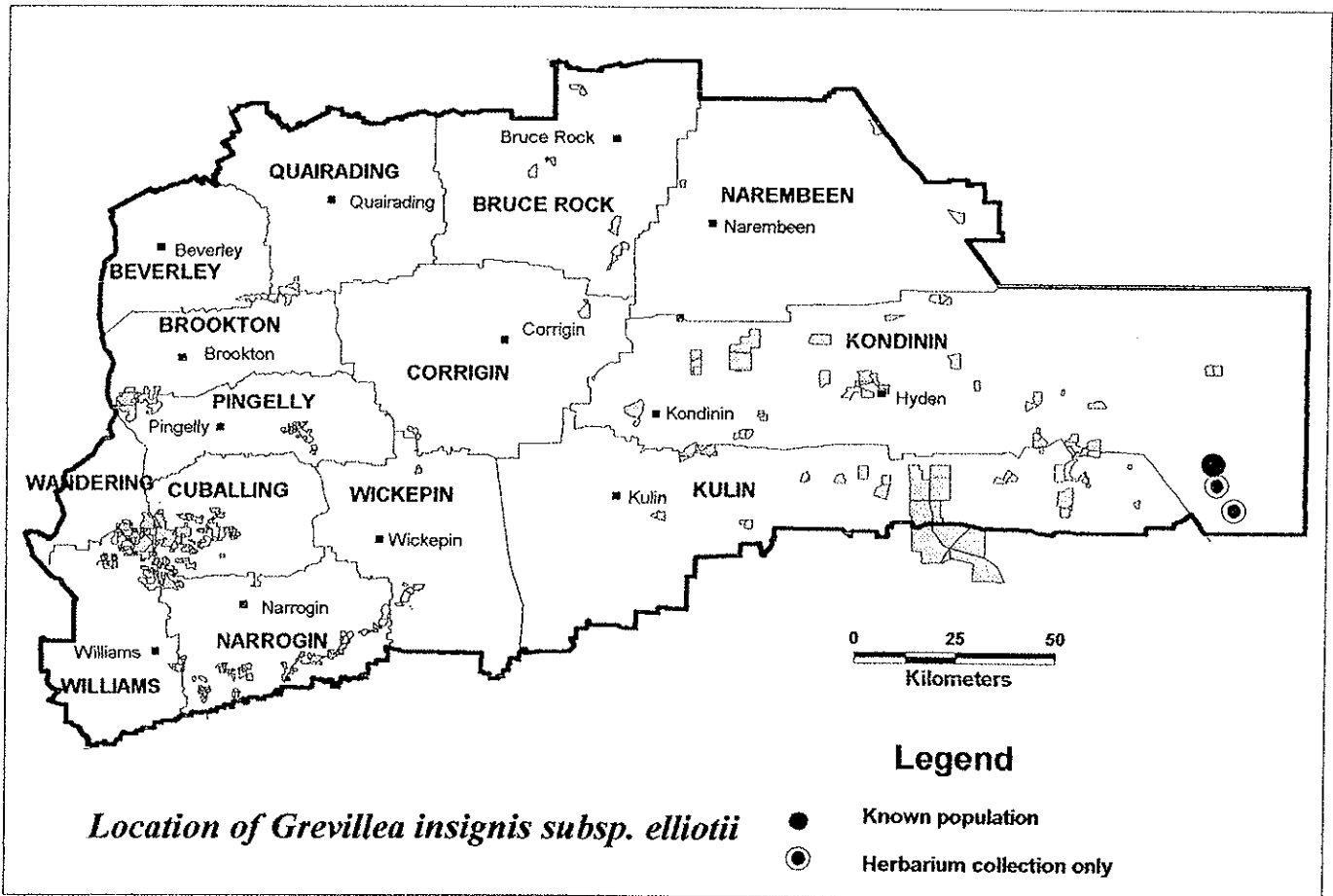
Management Requirements

- Reported to be not presently at risk, but the area is undergoing mining development and status may require consideration if proposed mining place populations at risk.
- Monitor known populations occasionally.

Research Requirements

- Survey to relocate reported populations at Middle Ironcap, South Ironcap and Digger Rock. Survey other iron stone / greenstone formations in the Forrestania area.
- Collect voucher specimens for the W.A. Herbarium.

References Olde, & Marriott (1993).



Grevillea pilosa subsp. *redacta* Olde & Marriott

PROTEACEAE

A shrub to 50 cm high with widely spreading branches and branchlets covered with matted hairs mixed with glands. The 3-25 mm wide leaves have several forms, which may be: 3-5 spiny-tipped teeth usually with shallow sinuses, or narrowly wedge shaped at the base and margins deeply divided with 5-12 linear to narrowly triangular pungent lobes with deep sinuses. Main flower stalk covered with short, flat hairs. The 7-8 mm long and 2.5-3 mm wide perianth is rose pink with white or cream hairs, moderately hairy outside, the hairs white or pale brown. Limb is dull brown. Style is pinkish-red with white hairs. The subspecies differs from the main species in the smaller and less hairy perianth and reduced leaf size.

Flowering period: Spring - Summer.

Distribution and Habitat in the Narrogin District

Confined to a small area north of Lake Cronin to Holt Rock. It grows on sand over laterite and gravelly rises in heath and open mallee.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|-------------------------|-------------|-------|-------------|---------------|-----------|
| 1* North of lake Cronin | 10/12/64 | Kon | VCL | ? | Gardner |
| 3* Holt Rock | 12/62 | Kul | ? | ? | Davies |
| 4* Lake Cronin | 05/10/86 | Kon | ? | ? | Crisp |

Kon Shire of Kondinin

Kul Shire of Kulin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Presumed susceptible.

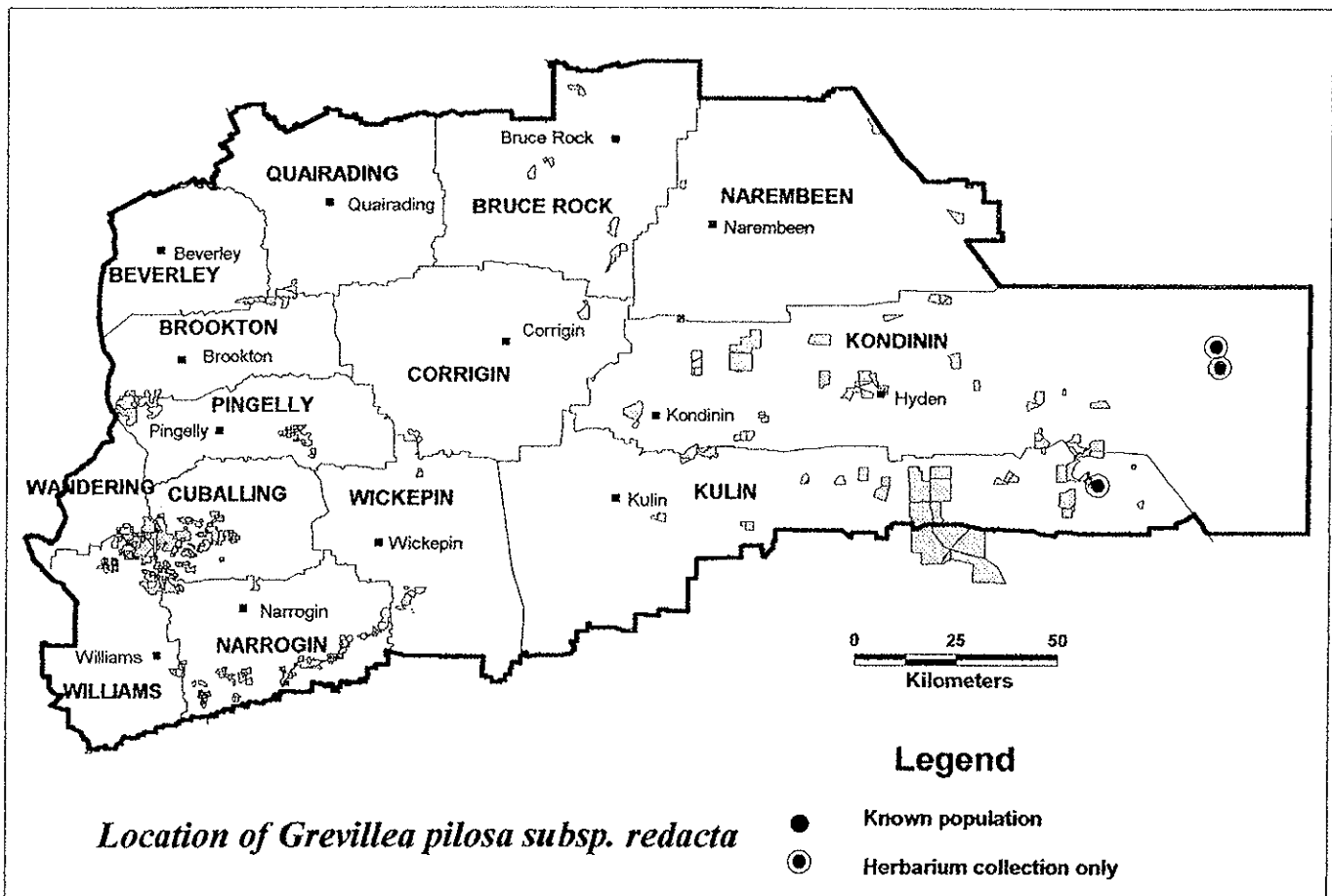
Management Requirements

- Consider status change to Priority 2 after surveys are completed.

Research Requirements

- Survey to relocate population number 1, 3 and 4. Collect vouchers for the W.A. Herbarium.
- Survey similar habitat type on adjacent conservation reserves for new populations.

References Olde & Marriott (1993).



Grevillea spinosissima McGillivray

PROTEACEAE

G. spinosissima is a very spiny, irregularly branched shrub, 0.6-1.3 metre tall. The branches are sometimes open, and columnar. The branchlets are rounded and covered with dense matted-erect hairs. The leaves are upward curving-spreading, rigid and usually three times divided with very pointed lobes, 0.4-1.5 cm long, and 0.7-1.4 mm wide. Lobes are 3-7mm long and the mid-vein on the upper surface is usually evident, but prominent on the lower surface. The flowers are hairless, white with broad cone-like style-ends. The perianth is white to yellowish and the limb in bud is mauvish. The species is named from the Latin *spinosissimus*, meaning very spiny, in reference to the very pointed leaf lobes.

Flowering period: From September - October. Also recorded in June and as late as January.

Distribution and Habitat in the Narrogin District

Recorded from an area near the Mawson Tower, growing in soils ranging from well-drained white sands to gravelly lateritic loams. It grows in mostly heath or shrubland vegetation types, however, it has also been recorded growing under very open mallee, and open woodland of *Allocasuarina huegeliana*. It is often associated with species such as *Leptospermum erubescens*, *Gastrolobium spinosum*, *Allocasuarina humilis* and *Hypocalymma angustifolium*.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|------------|-------------|-------|-------------|---------------|----------------------|
| 6 Mawson | 08/06/95 | Qua | RVS&PP | 50 | Good |
| 7 Mawson | 08/06/95 | Qua | RVS | 10 | Disturbed road verge |
| 8 Mawson | 08/06/95 | Qua | RVS | 2 | Disturbed site. |
| 9 Mawson | 08/06/95 | Qua | RVS&PP | 100+ | Good |
| 10 Mawson | 02/08/95 | Qua | TBR | 30 | Good |

Qua Shire of Quairading
* population known only as Herbarium record

Response to Disturbance

Appears to regenerate on disturbed sites and will grow satisfactorily on undisturbed sites.

Susceptibility to *Phytophthora* Dieback

Unknown.

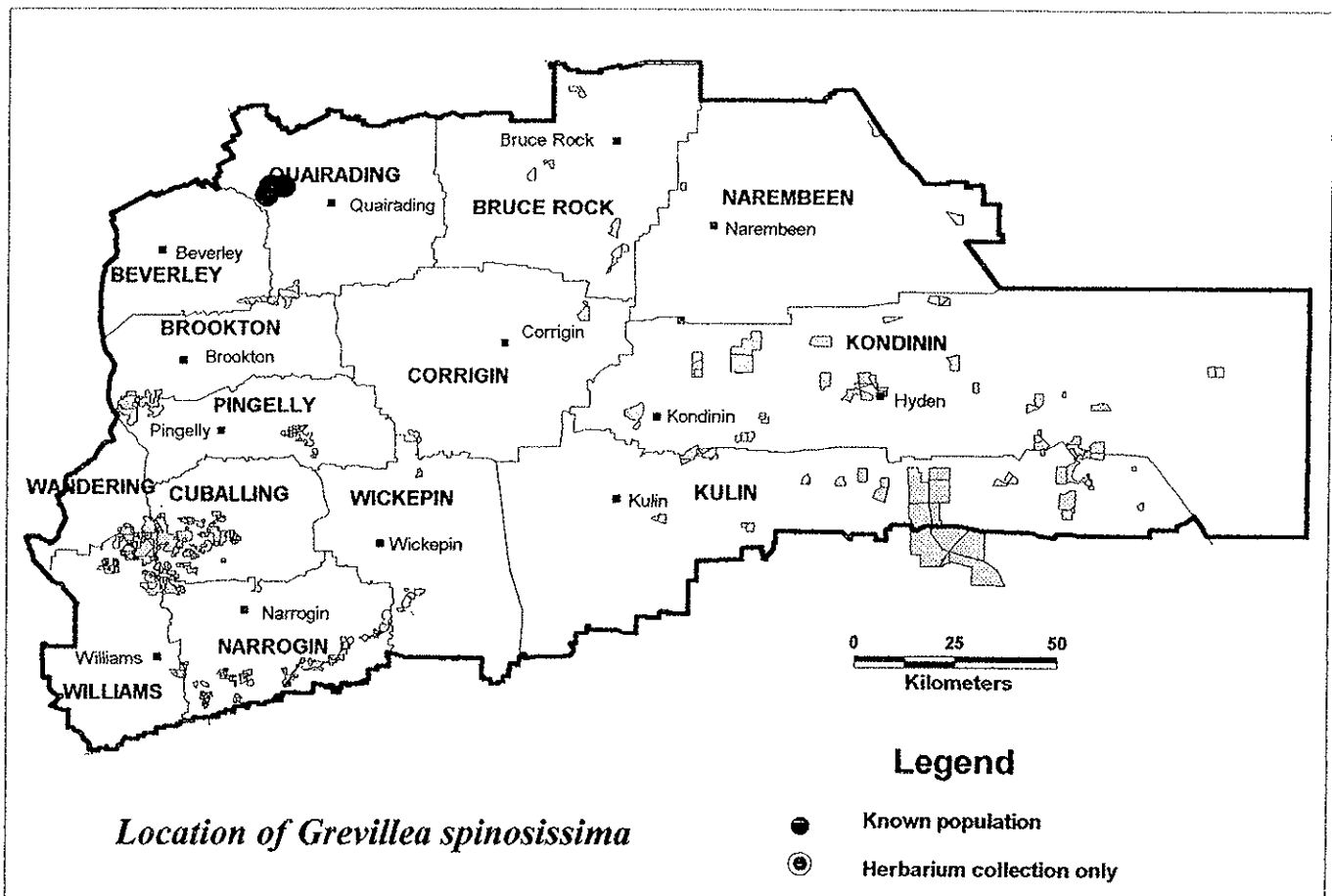
Management Requirements

- Monitor populations occasionally
- No populations of *G. spinosissima* are conserved on Nature Reserves. The reserve containing population number 10 should become a nature reserve. Populations 6 and 9 on private property should be further assessed for fencing under the Remnant Vegetation Protection Scheme.

Research Requirements

- Search for new populations on reserves containing similar vegetation and soil types.

References McGillivray (1993).



Hakea myrtoides Meissner

PROTEACEAE

A spreading shrub to 0.6 - 0.9 metres tall. The branches contain a few hairs, some hairless. The leaves are sessile, 12-20 mm long, egg shaped, usually broad, with sharp point, rather shiny with a midrib and nerve-like margins. The pink flowers are in clusters at the leaf axil. The flower stem is short and hairy. The perianth hairless. The ovary almost stalkless. The fruit about 11 mm long and 6 mm wide with a rather long incurved beak.

Flowering period: June - August.

Distribution and Habitat in the Narrogin District

The main populations occur along the scarp in the Perth Region. However, it also is known from near Brookton and Mogumber. It may be found growing in heath and low scrubland or open Wandoo woodland with *Allocasuarina campestris* on laterite. Sometimes it is associated with granite/dolerite boulders or its weathered products, such as dolerite clay.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|--------------|-------------|----------|-------------|---------------|-----------|
| I=*Youraling | 21/06/84 | Brookton | ? | ? | Not known |

Bro Shire of Brookton
=* population not stored in WA Herbarium records

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Presumed susceptible.

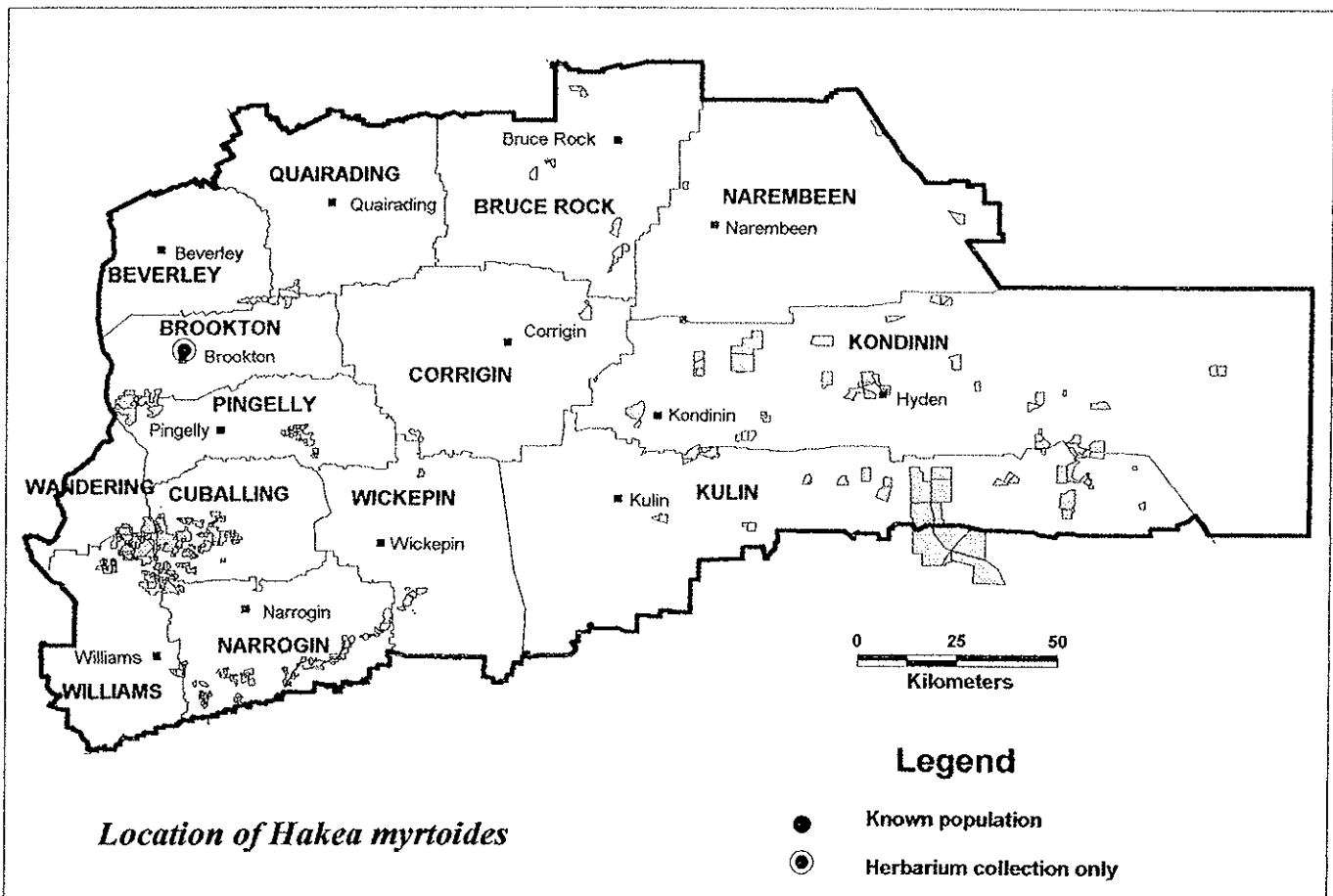
Management Requirements

— Nil.

Research Requirements

- Survey to locate population 1, confirm numbers, habitat and collect voucher for the W.A. herbarium. (A voucher of population number 1 is located in the CALM Narrogin District Herbarium only).
- Survey opportunistically, for new populations on conservation reserves in the Brookton area.

References Meissner (1845).



Isoetes brevicula Johnson

ISOETACEAE

I. brevicula grows to 1 cm tall with tufts of spirally arranged pointed leaves on a well-developed 3-lobed fleshy, 2-4.5 mm wide stock. The 4-8 mm long fleshy leaves number 4 to 8 per plant are cylindrical and slightly tapered and flattened towards the axis. The tip of the leaf ends in a point and is often dark. The immature megasporangia is circular about 1.2 mm in diameter; the megaspores number 4-16 per sporangium, about 300-400 microns. Microspores are light brown in colour.

Flowering period: September.

Distribution and Habitat in the Narrogin District

Found in shallow 3-6 cm deep rock pools on top of large granite monoliths that rise up to 50 m above the surrounding plain, in the eastern portion of the Narrogin District. It is frequently crowded by other aquatic plants and is not present at every pool. It only regenerates in the winter.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-----------------|-------------|-------|-------------|---------------|-----------|
| 1* Graham Rock | 21/09/71 | Kon | NR | 15 | |
| 2 Lily McCarthy | Kulin | Kul | NR | 100+ | Healthy |
| 4 Glenelg Hills | 06/10/93 | Nar | NR | 100+ | Healthy |
| 5 Twine | 01/09/94 | Nar | WAR | 100+ | Healthy |

Kon Shire of Kondinin

Kul Shire of Kulin

Nar Shire of Narembeen

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

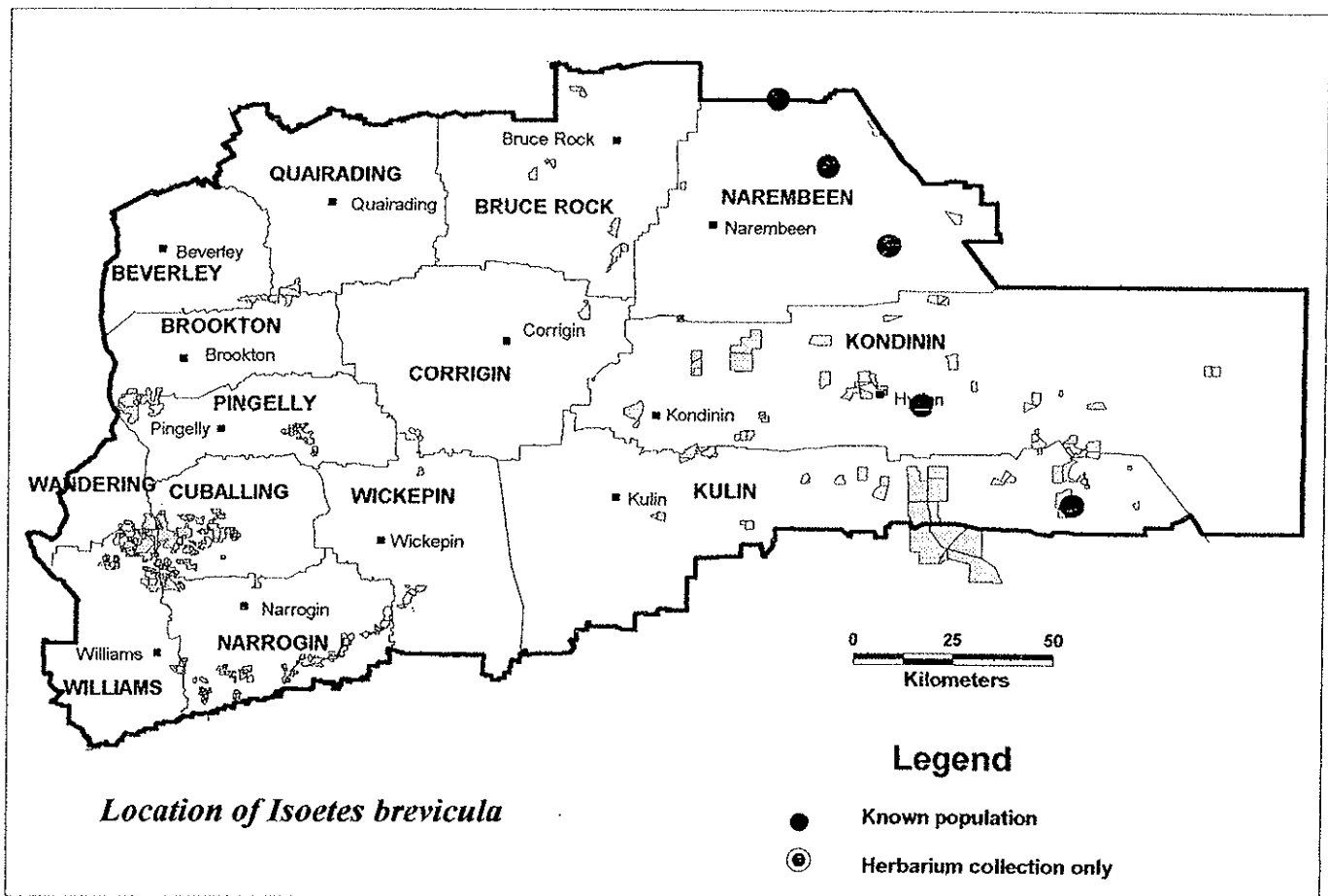
Management Requirements

- Monitor known populations occasionally.

Research Requirements

- Survey for new populations on large granite rocks, at the end of the growing season when megaspores are present, within the species' known range.
- Confirm correct determination for populations 2, 4 and 5. Collections for these populations were too immature for a determination.

References Johnson (1984).



Jacksonia epiphyllum Chappill ms.

PAPILIONACEAE

J. epiphyllum ms. is an erect to straggling sparse pea flowering shrub 0.5 - 2 metres tall. The leaves are mid - green with a pale bluish-tint, they appear to be deeply lobed. The flowers are yellow - orange in colour and flower profusely on the plant. The flower bracts are large and woolly. Sepals are golden/brown and the corolla is yellow.

Flowering period: October - December.

Distribution and Habitat in the Narrogin District

Known from near Toodyay to the Popanyinning area. It grows mostly on sandplain or laterite soils however, also found in loam and clay soils. Vegetation associations include *Dryandra* heath, open woodland and low forest.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|-----------------|-------------|-------|-------------|---------------|-----------|
| 1* Dryandra | 10/11/72 | Cub | SF | ? | Nelson |
| 2* Popanyinning | 20/11/62 | Cub | ? | ? | Lullfitz |
| 3* Popanyinning | 08/10/83 | Cub | COM | ? | Keighery |
| 4* Tutanning | 14/05/77 | Pin | NR | ? | Muir |
| 5 Boyagin Rock | 18/11/85 | Bro | NR | ? | Foreman |

Cub Shire of Cuballing

Pin Shire of Pingelly

Bro Shire of Brookton

* population known only as Herbarium record

Response to Disturbance

Unknown. However, it may respond favourably to fire or mechanical disturbance.

Susceptibility to *Phytophthora* Dieback

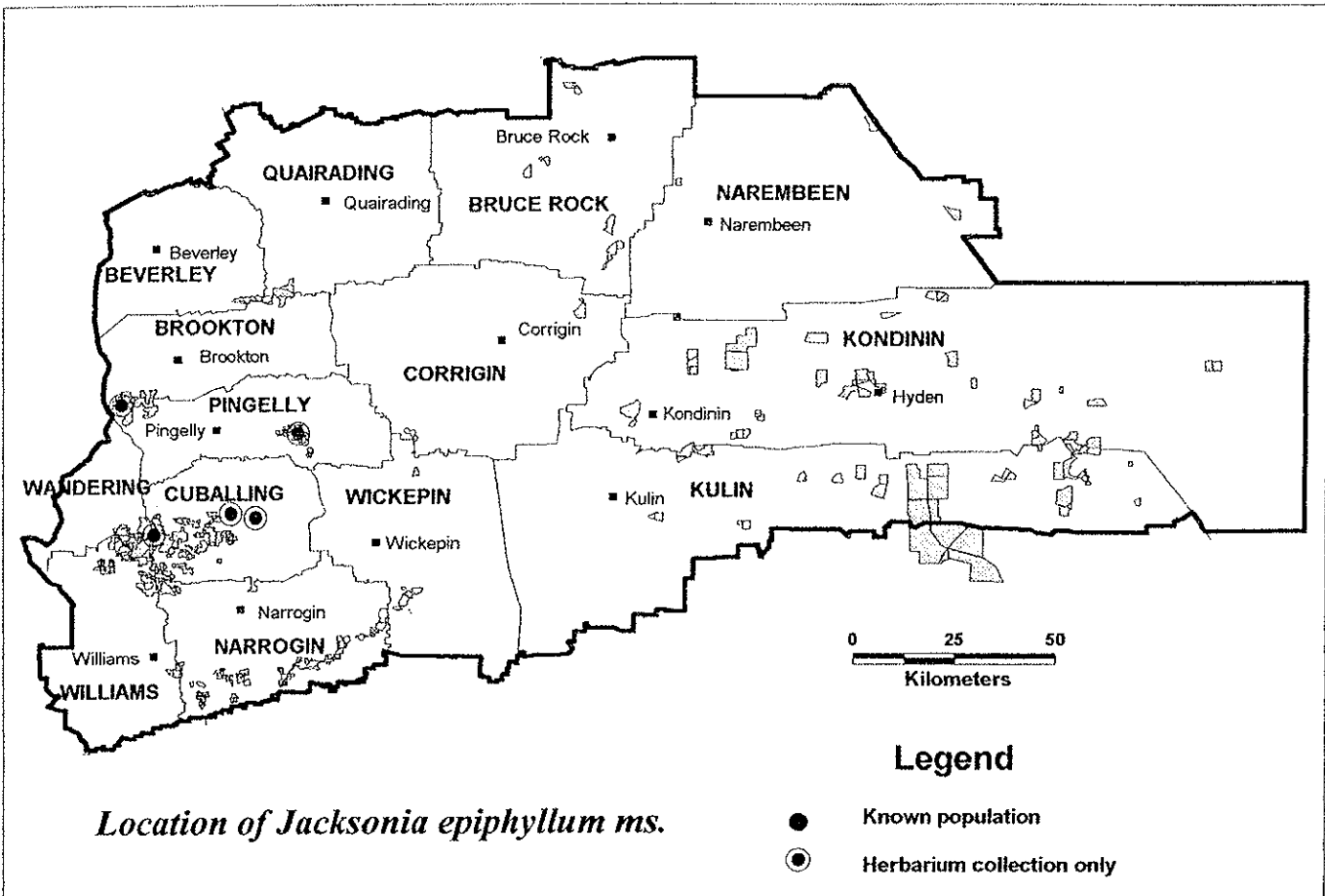
Unknown.

Management Requirements

- Ensure population number 5 is not disturbed during reserve management operations.

Research Requirements

- Survey to relocate population number 1, 4 and 5. Record numbers and record habitat details.



Lasiopetalum fitzgibbonii Mueller

STERCULACEAE

An erect, spreading, moderately dense, 1-1.5 metre tall, perennial woody shrub. Leaves are dull light green, short, linear-cylindrical, blunt with some branched hairs. Flowers are pink to mauve or lilac. Peduncles are very thin, having 2-5 clusters. Bracts are minute, linear, only one under each calyx. Calyx lobes are dull light pink, thin, cleft nearly to the base, segments almost linear. Anthers are stalkless and blunt. Ovary thinly covered with down- like hair.

Flowering period: September - November.

Distribution and Habitat in the Narrogin District

Baron von Mueller collected and described *L. fitzgibbonii* as occurring "In the back-scrubs of the country at King George's Sound". However, since then it has been located at Nyabing, Jerramungup, west and north west of Ravensthorpe and about 200 km north at Barker Lake. In the Narrogin District, it was collected at "Jilakin Salt Lake" east of Kulin. It favours sandy loams with some gravel to clayey soil and grows in sometimes thick mallee heath and scrub. It may favour drainage lines associated with colluvium or alluvium soils, but probably not occurring on lake dunes.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|----------------------|-------------|-------|-------------|---------------|-----------|
| 4* Jilakin Salt Lake | ? | Kul | ? | ? | Unknown. |

Kul Shire of Kulin

* population known only as Herbarium record

Response to Disturbance

Unknown. However, its response to salination and water logging should be determined.

Susceptibility to *Phytophthora* Dieback

Unknown.

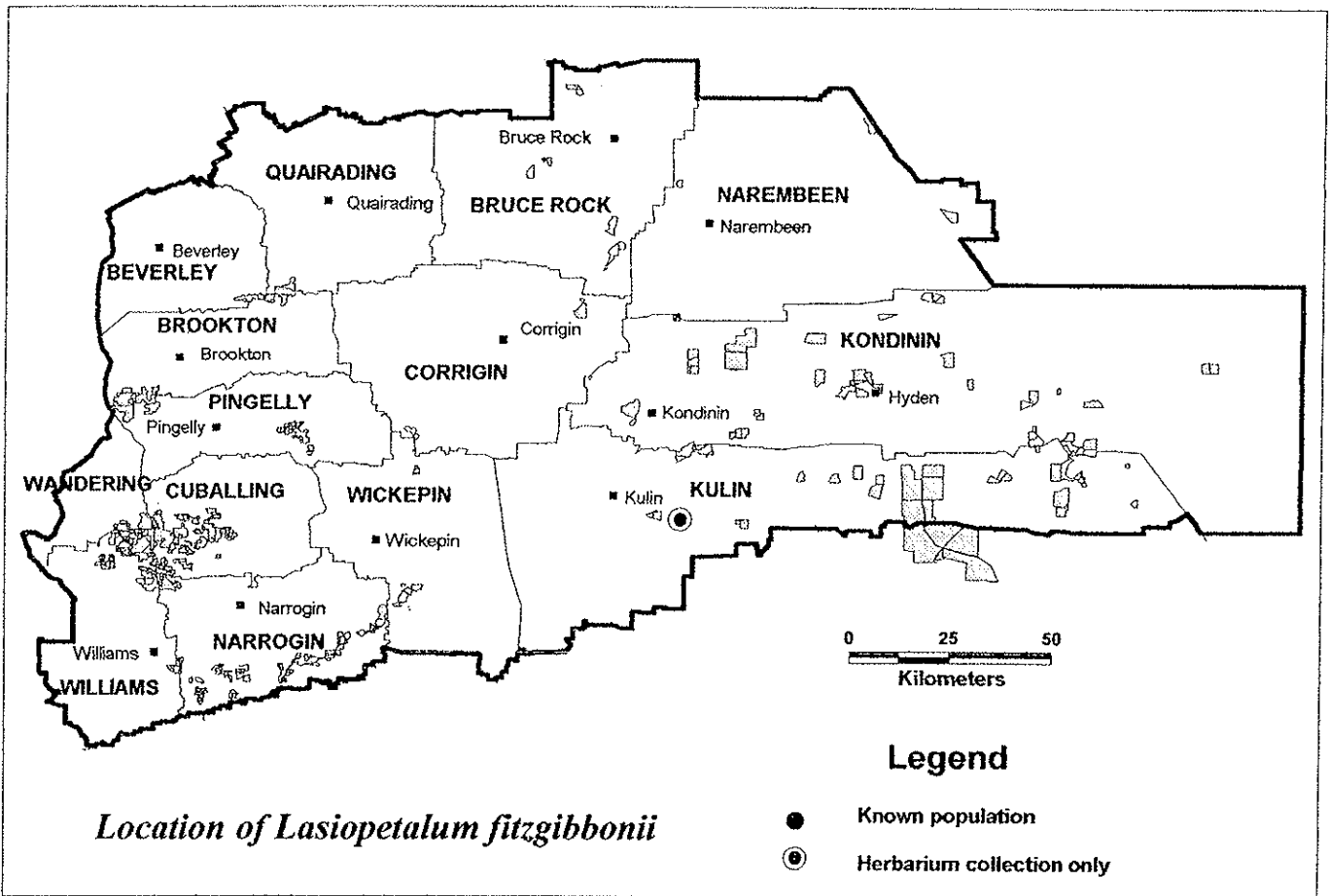
Management Requirements

– Nil.

Research Requirements

– Survey areas around Jilakin Lake to relocate population 4.

References Mueller (1882).



***Laxmannia grandiflora* subsp. *stirlingensis* (Lindl.) Keighery ANTHERACEAE**

A stilted, slender, erect but straggly, perennial herb to 22 cm tall. The stem is 1-2 mm wide. The 37 mm, and 1 mm wide erect leaves are long and narrow with a pointed tip. Sheathing at the base is transparent, the leaf margin is finely divided. The flower cluster is surrounded by many bracts in 3 layers. The flower cluster stem is 12-22 cm long with 21-29 flowers. The white flowers are cup shaped and up to 12 mm wide.

Flowering period: September - October.

Distribution and Habitat in the Narrogin District

An odd distribution with two disjunct populations: one between Northam - Quairading and the other south east of the of the Stirling Range. In the Narrogin District, it has been collected near Mawson, west of Quairading. It has a clear preference for grey or white sandy clay or loam. Geologically, this may be soils associated with colluvium. It occurs in heath vegetation.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|------------|-------------|-------|-------------|---------------|-----------|
| 1* Mawson | 08/09/77 | Qua | PP | ? | Muir |

Qua Shire of Quairading
* population known only as Herbarium record

Response to Disturbance

It probably responds favourably to disturbance. A population near Northam, was found in a disturbed area.

Susceptibility to *Phytophthora* Dieback

Unknown.

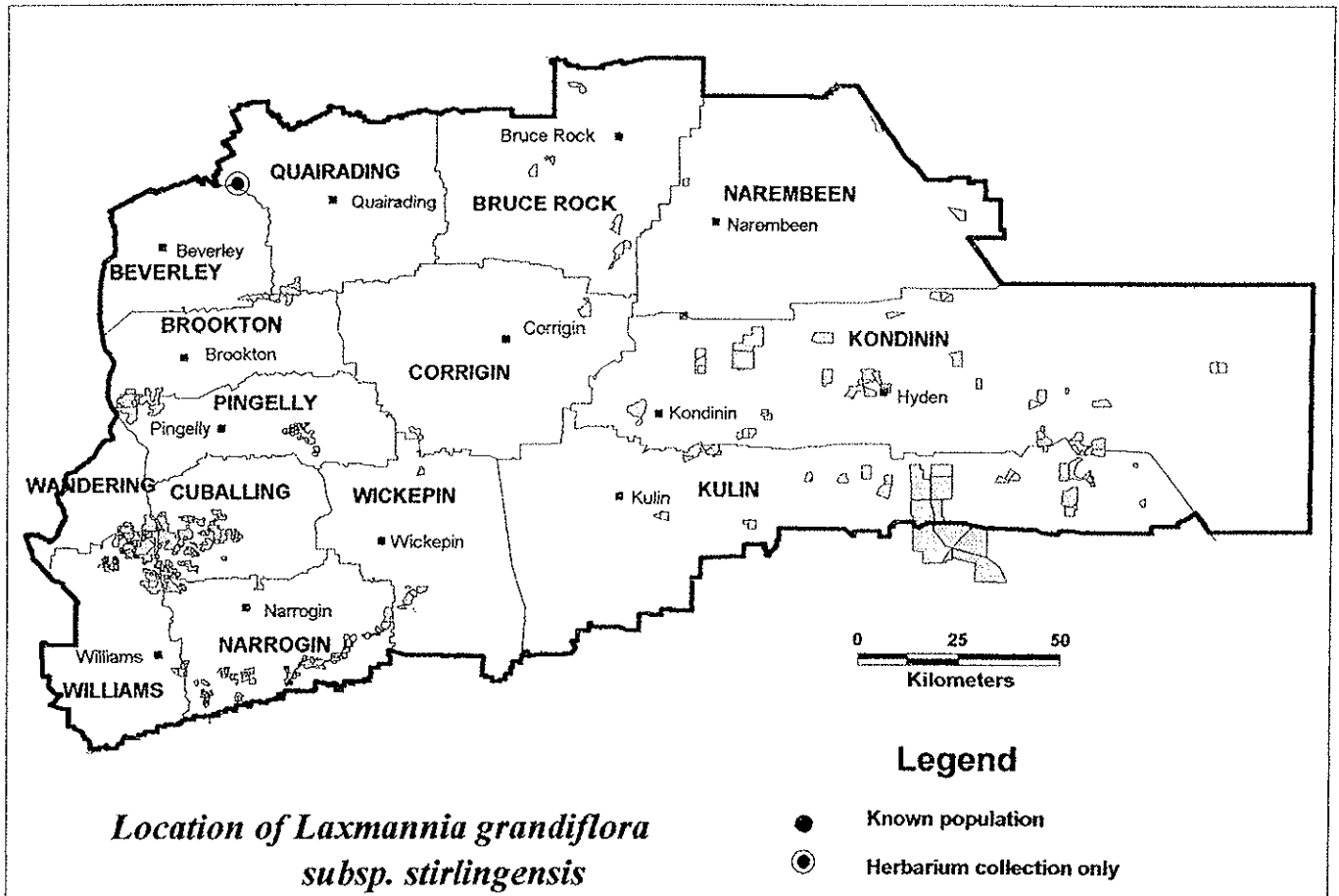
Management Requirements

– Nil.

Research Requirements

- Survey to relocate population number 1, record habitat and numbers.
- Survey on reserves in the Mawson area, and the proposed nature reserve west of Quairading, in grey or white sandy clay.

References Keighery (1987).



Melaleuca arenaria Gardner

MYRTACEAE

M. arenaria is a rigid bushy shrub from 30-90 cm high. The leaves are 3 mm long and 2 mm wide, alternate, rigid and spreading, obovate or almost circular when small, with a blunt tip and narrowed into a short stalk at the base. The midrib is faintly visible on the upper surface of the leaf. The flowers are pink in colour and borne in globular clusters at terminal ends of stems with a few flower clusters arranged together to form a dense head. New stem shoots grow out from the flower clusters after flowering. The fruit are woody capsules, smooth and narrow with a flat rim, globular to urn-shaped and loosely arranged in clusters of 2-6. The species is named from the Latin word *arenarius*, pertaining to or growing in sand.

Flowering period: September to November.

Distribution and Habitat in the Narrogin District

M. arenaria grows from near Bending southwards to the Dragon Rocks area. It may be found growing in sandy gravelly soil in association with low shrubs and heath vegetation.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|----------------|-------------|-------|-------------|---------------|-----------|
| 1 Bending | 07/10/93 | Kon | NR | Frequent | Healthy |
| 2 E Billericay | 28/04/94 | Kon | RVS | Scattered | Healthy |
| 3 Dragon Rocks | 04/11/93 | Kul | NR | Common | Healthy |
| 4 Dragon Rocks | 29/04/94 | Kul | NR | Frequent | Healthy |

Kon Shire of Kondinin

Kul Shire of Kulin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

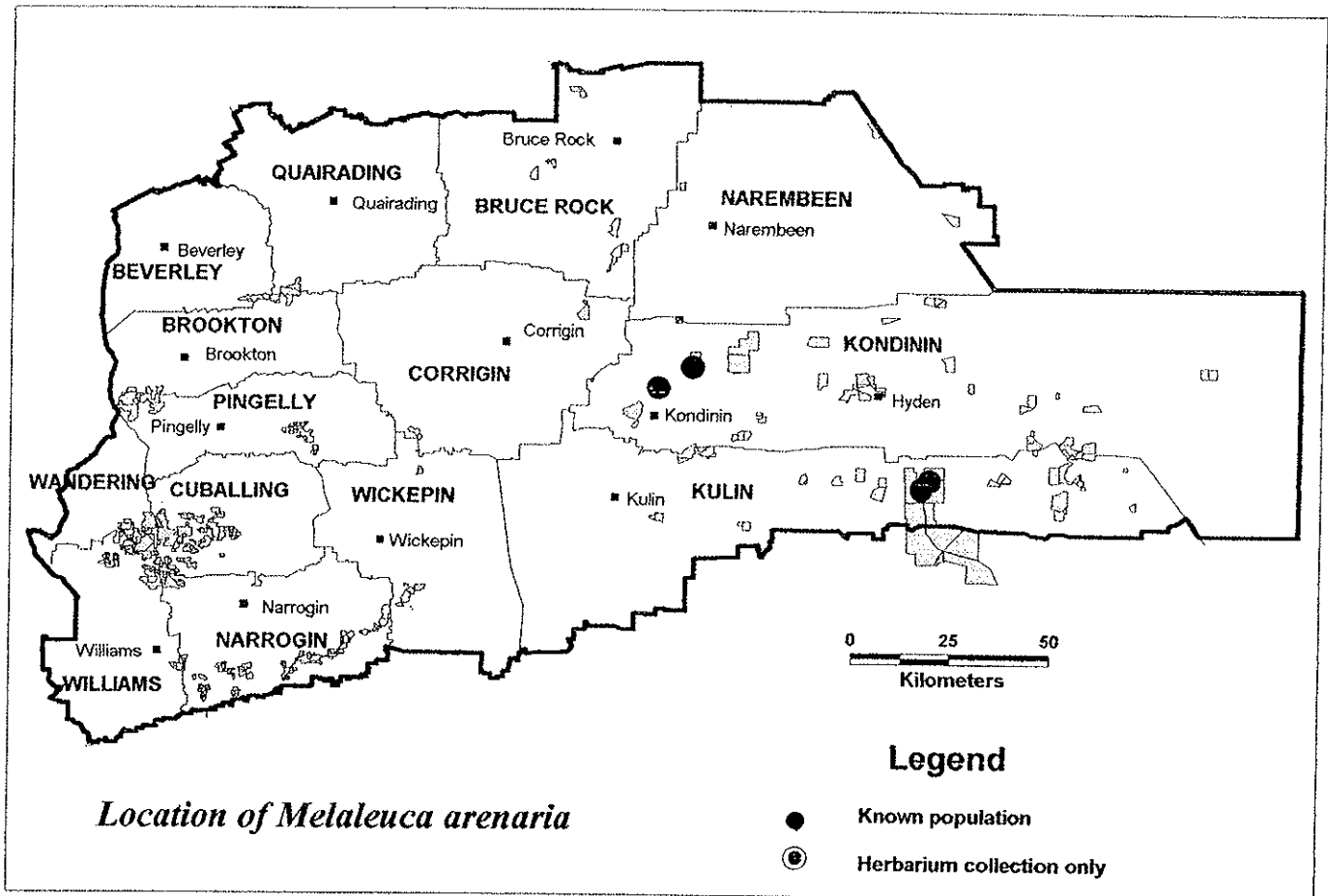
Management Requirements

– Monitor known populations occasionally.

Research Requirements

- Survey for this species within similar soil and vegetation types on other conservation reserves within its known range.

References Craven. (personal communication), Gardner (1923), Leigh (1984).



Monotoca leucantha Pritzl

EPACRIDACEAE

An erect straight 20 - 50 cm high slender shrub with numerous twig like branches. The small, light-green, diamond shaped, scale like leaves hug the branches and are deciduous. They are stalkless, concave above, and upward turning. The base of the leaf is narrowed and the leaf underside has 6-9 veins with 1 vein around the toothless leaf margin. The white flowers are small, stalkless and bunched in 3-5's. The genus name refers to the one celled ovary and the species name, to the white flower.

Flowering period: August - September.

Distribution and Habitat in the Narrogin District

In the Narrogin District, *M. leucantha* has been found east of Bruce Rock and in the area from Pingaring to the Flat Rock Nature Reserve. It is also known from the Moora District, 200 kilometres to the north west. It is also reported to occur near Hatter Hill and Kau Rock (north-north east of Esperance). It inhabits a "quartzite" "quartz soil" and "kaolinized breakaway" environment. The Narrogin District populations are known from quartz rich, kaolin zones occurring as breakaways along the margins of large dolerite dykes.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-----------------------|-------------|--------------|-------------|---------------|---------------|
| 1* Pinjaring | 06/10/94 | Kulin | NR | Nil | Not relocated |
| 5* Bruce Rock | 16/09/92 | Bruce Rock | RVS | ? | Unknown. |
| 6 Buckley's Breakaway | 29/04/94 | Kulin | NR | 500+ | Healthy |
| 9 Flatrock | 29/04/94 | Kulin | PP | 1000+ | Healthy |
| 10 North of Buckley's | 29/04/94 | Kulin | NR | c 500 | Healthy |
| 11 Llewellyn Rd | 31/08/94 | Kondin in | RVS | 100+ | Healthy |

Kul Shire of Kulin

Bru Shire of Bruce Rock

Kon Shire of Kondinin

* population known only as Herbarium record

Response to Disturbance

M. leucantha has little competition from other plants in its somewhat barren quartzite environment. However, sheep probably graze the plant. One quartzite breakaway on private property where sheep were grazing had no plants. Another breakaway on private land, where the grazing history was unknown had 1000+ plants.

Susceptibility to *Phytophthora* Dieback

Unknown.

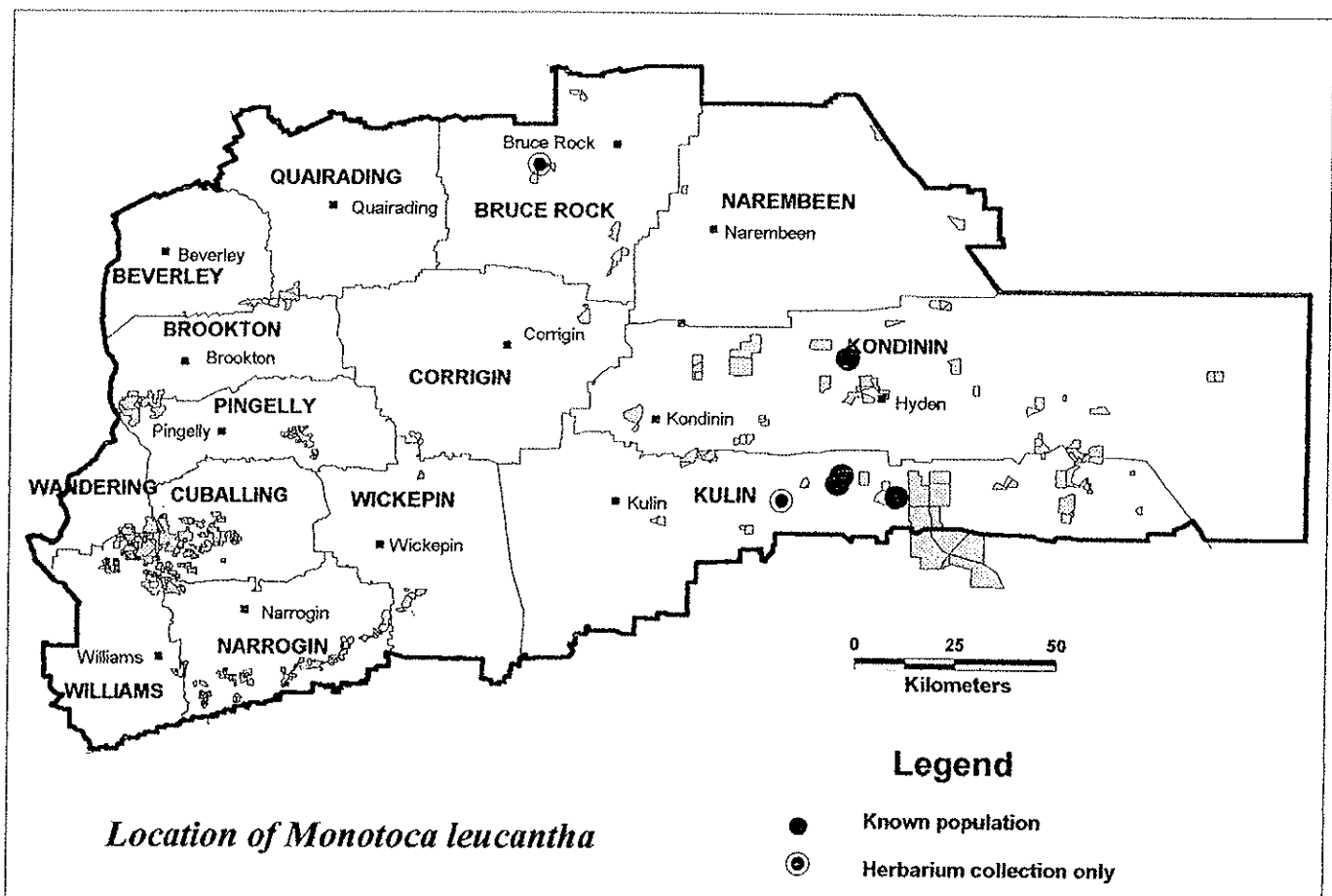
Management Requirements

- Monitor known populations on conservation reserves occasionally.
- Ensure population number 6 is protected from recreational disturbance.

Research Requirements

- Survey for additional populations on conservation reserves within the known range. The use of aerial photos to locate quartzite breakaways may assist in finding more populations. Survey quartz breakaways at Dragon Rocks Nature Reserves.

References Pritzel (1904).



Persoonia pungens Fitzgerald

PROTEACEAE

A small spreading shrub , 0.3-0.5 metre tall . The branchlets are covered in white hairs. The 10-12 mm long ovate or ovate-lance shaped leaves are hairless, rigid and faintly 1-nerved. They end in a sharp point and are on a short stalk. The flowers are hairless. The 8 mm long perianth is yellow with the anthers shorter than perianth. The ovary is hairless and 1-seeded. The style is robust and equal to anthers. The species name refers to the prickly leaves.

Flowering period: September - December.

Distribution and Habitat in the Narrogin District

The known distribution is from Coorow in the north, southwards to around Dowerin and nearly to Bruce Rock. The only population in the Narrogin District is near Belka. It inhabits open shrubland to very open woodland of *Grevillea* sp., *Acacia saligna*, *Allocasuarina campestris* and *Eucalyptus wandoo* on white or yellow sand, sometimes over laterite.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|------------|-------------|-------|-------------|---------------|-----------|
| 7 Belka | 13/10/88 | Bru | NR | 35 | Not known |

Bru Shire of Bruce Rock

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

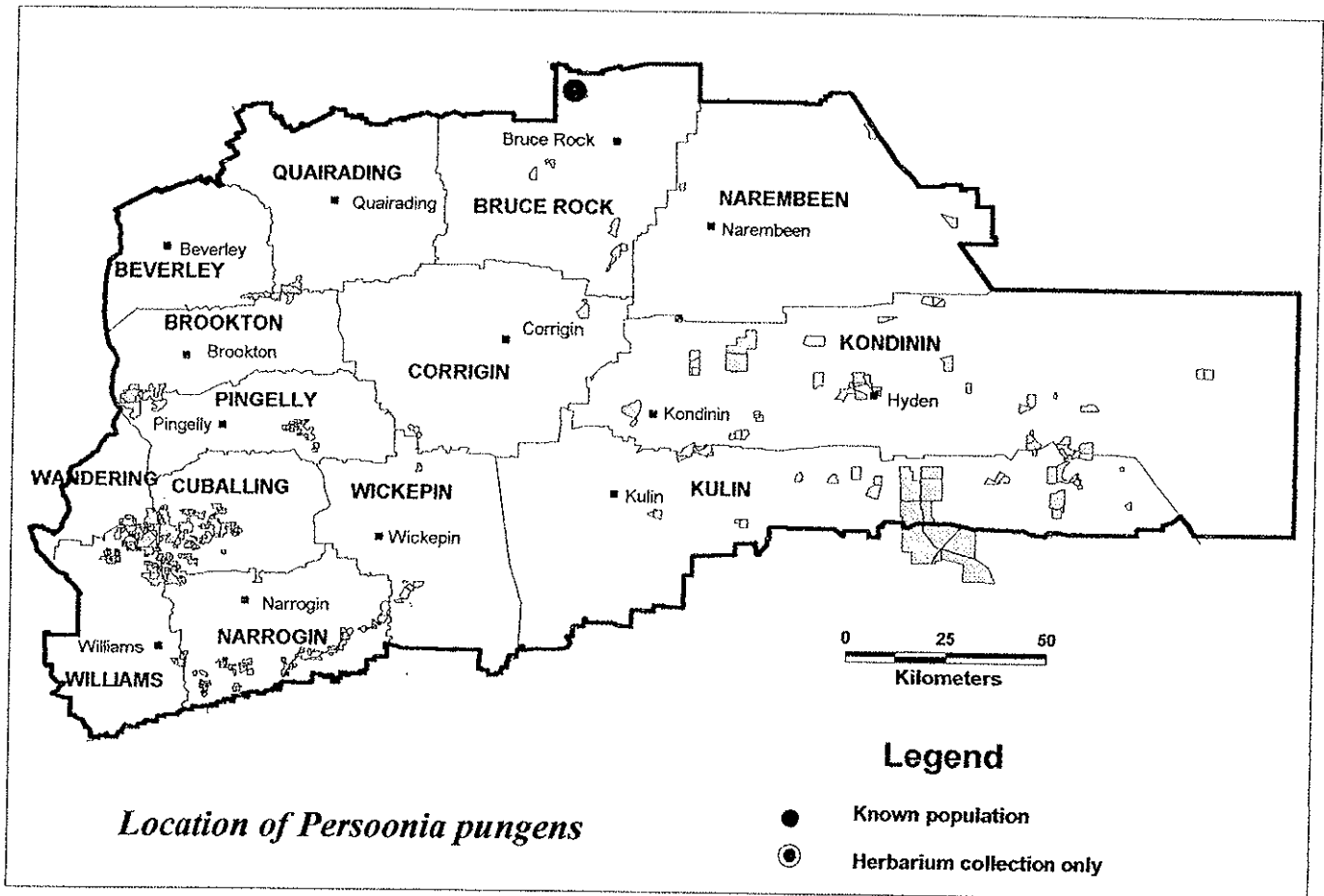
Management Requirements

– Ensure population 7 is protected during reserve management operations.

Research Requirements

- Survey to locate population 7 to confirm numbers and habitat. Collect voucher specimen for the W.A. Herbarium.

References Fitzgerald (1912).



Persoonia sulcata Meissner

PROTEACEAE

A small shrub to 30 cm tall with many branches, slender, twiggy mostly hairless branches. The outer branchlets arise at different levels from the stem but all end at about the same level. They are covered with very short soft hairs. The alternate leaves are 2-3 cm long, crowded, spreading, linear and flattened to cylindrical or awl-shaped, sharply pointed, doubly grooved on both sides, with a prominent margin and midrib. The greenish or yellow flowers are borne singly in the leaf axil on peduncles 2-6 mm long. The 1.2-1.5 cm long perianth is hairless and divided into 4 almost separate segments. The fruit is like a stone fruit, thick succulent outside with a thick hard inner shell surrounding the seed. The species name refers to the distinct grooves on the leaves.

Flowering period: September - November

Distribution and Habitat in the Narrogin District

Known mainly from the Northam - Bindoon - Calingiri area. The only location in the Narrogin District was reported in 1929 at Narembreen. It favours open *Eucalyptus* woodland on lateritic soils that may contain clay, sand and quartz. It is also reported to occur on brown loam, brown loamy grit ?granite, sandy quartzite gravel with many quartz rocks and sandy lateritic clay. It may grow in association with *Dryandra* sp., *Hibbertia* sp., *Allocasuarina huegeliana*, *Isopogon dubious* and *Schoenus clandestineus*.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|---------------|-------------|-------|-------------|---------------|-----------|
| 5* Narembreen | 09/19/29 | Nar | ? | ? | Blackall |

Nar Shire of Narembreen

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Presumed susceptible.

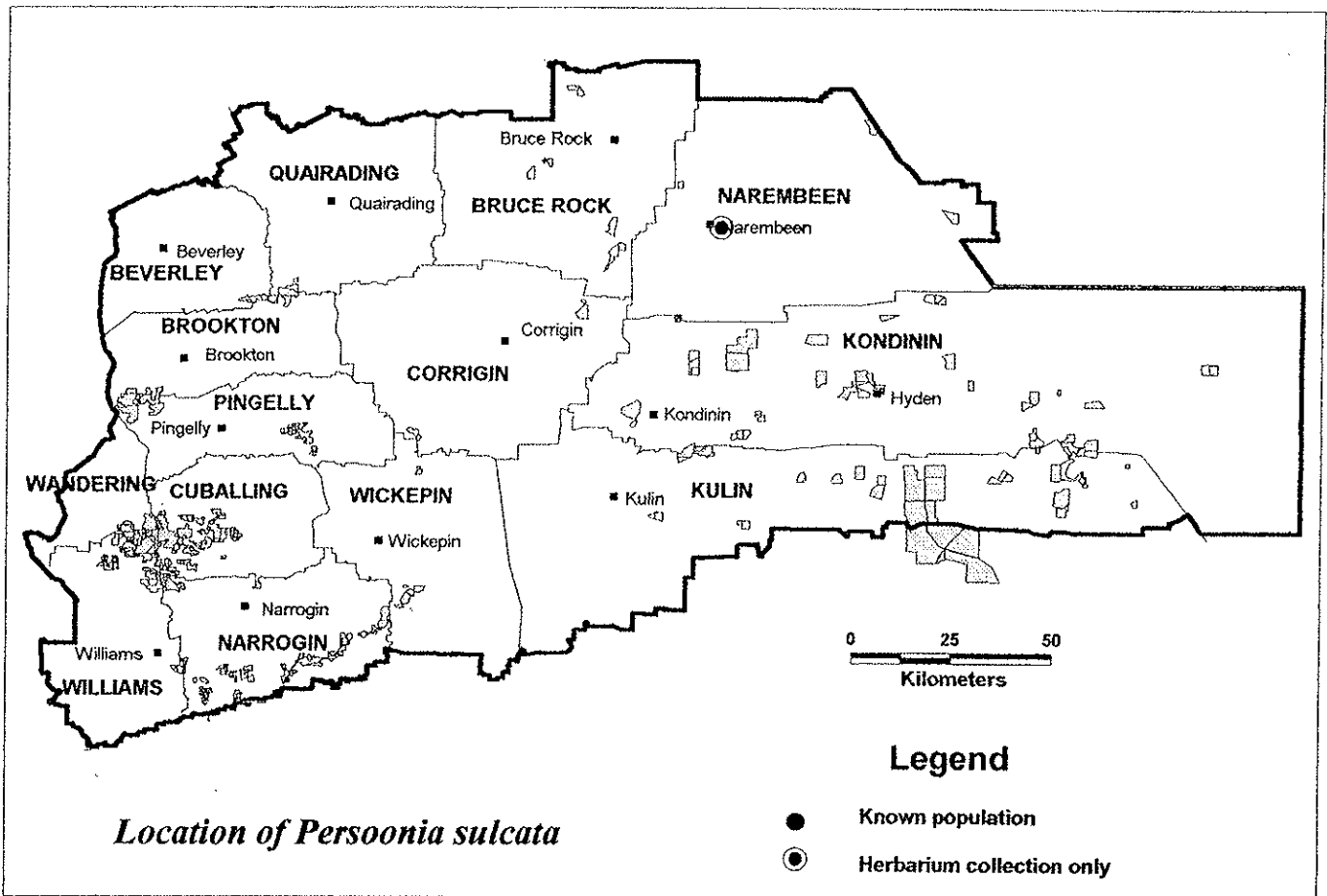
Management Requirements

- Nil.

Research Requirements

- Survey opportunistically on conservation reserves, especially in the Narembeen area.

References Bentham (1870), Meisner (1856), Leigh Boden & Briggs (1984).



Pimelea granticola Rye

THYMELAEACEAE

P. granticola is an erect, 0.2-1 metre high spreading shrub, single-stemmed at ground level. The stems are pale yellow-green or red-brown near the flowers. Further down the stem it becomes medium grey to almost black and hairless. The alternate, long and narrow, 4-17 mm long by 0.5-1 mm wide leaves are pale green to bluish green, flat or concave toward the axis, pointed or blunt. The whorled bracts are numerous, about 40, becoming bent in the fruit. They are similar in colour to the leaves, narrowly triangular to elongated, 6-8 x 1-2 mm, hairless or sparsely hairy outside and densely hairy inside. The flower cluster is erect and compact. The flower stalks are 0.2-0.5 mm long, hairy with the longest hairs about 1 mm. The flowers are cream or white and the floral tube is very densely hairy. The 2-5 mm long sepals are elliptic or narrowly elliptic, with hairs on outside to 1-2 mm long and hairless inside. The species name refers to the occurrence of the species on granite outcrops.

Similar to *P. villifera* but differs in having more numerous whorled bracts.

Flowering period: September - December.

Distribution and Habitat in the Narrogin District

There are nine recorded populations of *P. granticola*. The two populations in the Narrogin District are mentioned as occurring "near Pingaring" and on the "Mount Holland Road". Elsewhere, it is known from Chiddarcooping Hill southwards to Dragon Rocks. It inhabits soil pockets on granite outcrops or shallow soil over granite sheets.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|------------------|-------------|-------|-------------|---------------|------------------------------|
| 2* Holland Track | ?/11/31 | Kul? | ? | ? | Gardner/Blackall |
| 6 Pingaring | ? | Kul | ? | ? | Mentioned in literature only |

Kul Shire of Kulin

* population known only as Herbarium record

Response to Disturbance

The response to disturbance is unknown. However, the competition of agricultural grasses in shallow soils and crevices around some granite rocks, may be detrimental to the plants survival.

Susceptibility to *Phytophthora* Dieback

Unknown.

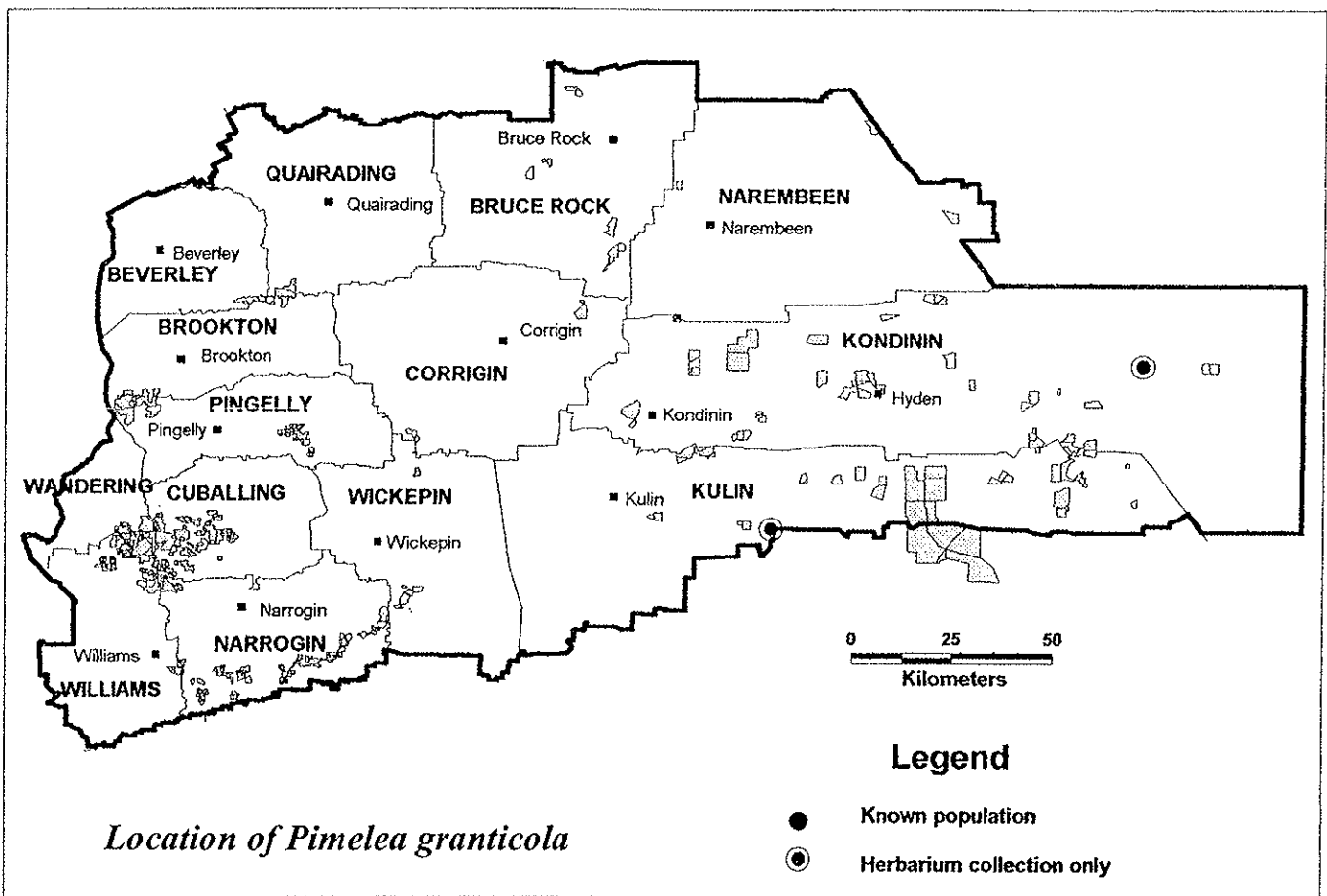
Management Requirements

- Nil until populations located in the District.

Research Requirements

- Survey for populations on granitic outcrops on conservation reserves within its known range. The plant may be difficult to locate in surveys.

References Rye (1988).



Prosteranthera nanophylla Conn

LAMIACEAE

A small 0.1-1 metre high shrub with almost white cylindrical branches that are compressed laterally near their end and are sparsely to densely hairy, The green leaves are clustered on short axes and unclustered along long axes. They are hairless or with some curled hairs on the margins. The flower head is fern like, consisting of 6-10 flowers. The hairy pedicel is 1.2 mm long. The calyx is green to maroon, the calyx tube about 1.7 mm long and sparsely hairy. The corolla is 8-14 mm long, mauve, blue to white, the inner surface spotted. The anthers are about 1 mm long, the lobes with not always a conspicuous appendage. The species name refers to the small leaves.

Flowering period: October - ?November.

Distribution and Habitat in the Narrogin District

Known from near Cadoux to Southern Cross and Marvel Loch then to east of Ravensthorpe. In the Narrogin District, it occurs just north of Hyden.(The herbarium specimen for this population resides in Adelaide). Its habitat is sand over laterite and occurs in association with mallee, *Acacia* and *Grevillea* scrub.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|------------|-------------|--------------|-------------|---------------|-----------|
| 1* Hyden | 10/11/68 | Kondin in | ?RVM | ? | Wrigley |

Kon Shire of Kondinin
* population known only as Herbarium record

Response to Disturbance

- May respond to disturbance. One herbarium sample is recorded as growing on disturbed roadside verge.

Susceptibility to *Phytophthora* Dieback

Unknown.

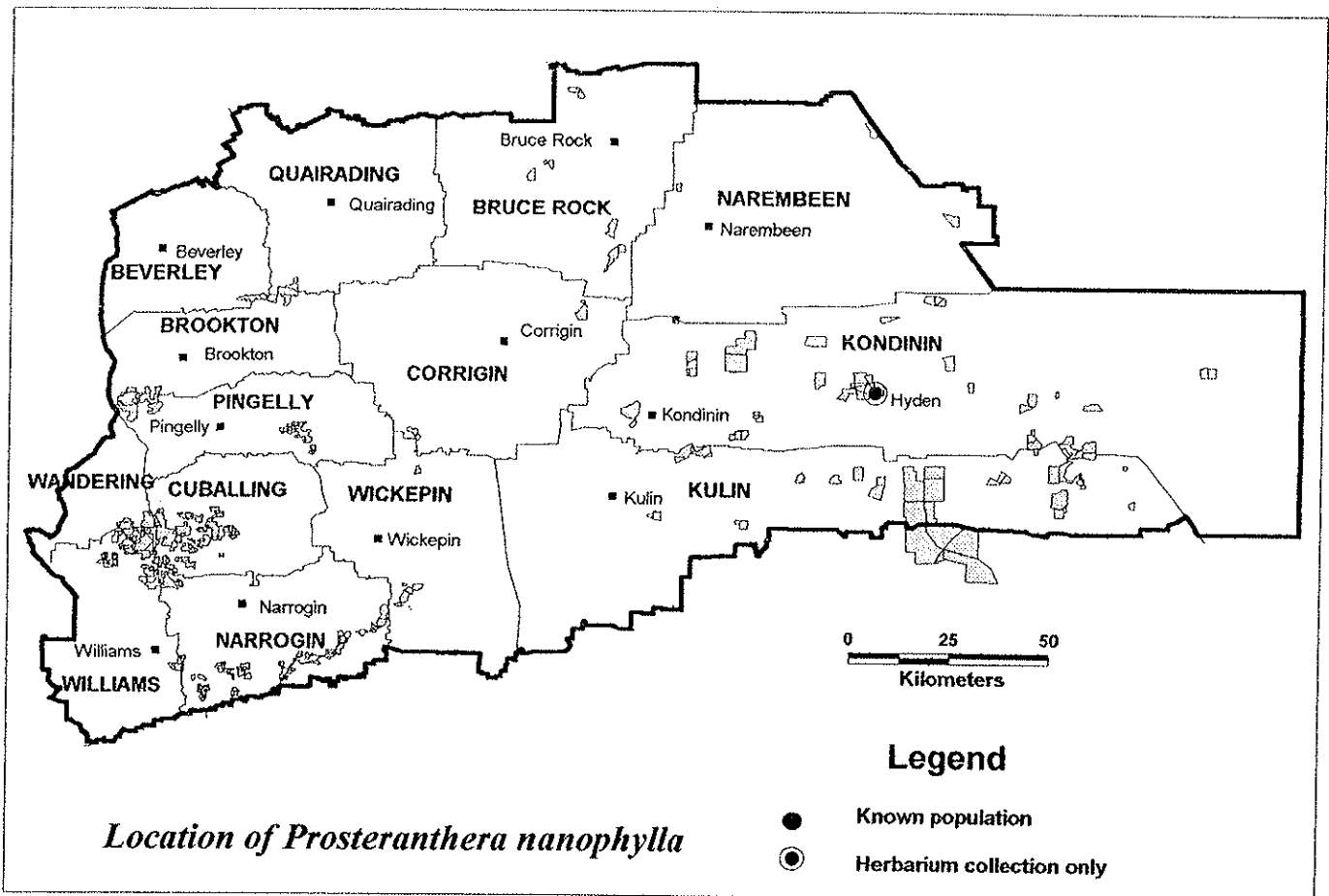
Management Requirements

- Nil until population number 1 is located.

Research Requirements

- Survey to relocate population number 1, about 9.6 kilometres north of Hyden toward the Humps.
- Survey opportunistically on conservation reserves with similar sand over laterite habitat.

References Conn (1988).



Stenanthemum coronatum Reisseck

RHAMNACEAE

A prostrate 2-5 cm tall shrub, the young stems have star shaped and simple hairs. The leaf stalk is only 0.5-1 mm long, usually with a few large simple hairs on undersurface. The leaves are glossy, dark green above, dull white and densely hairy below, usually egg-shaped or triangular with the narrow end towards the point of attachment. The flowers are dull to creamy white, tubular, densely hairy outside with mixture of star shaped hairs and simple hairs bent forward. the flower lobes are free in the top one-quarter to half and not free at disc. The petals are hooded over the anthers. The filaments appear joined to the calyx and corolla but they are free. The seed is pale brown, with mid brown markings.

Flowering period: June & November.

Distribution and Habitat in the Narrogin District

There are two collections, one from south east of Northam, the other from Dryandra State Forest. The habitat is laterite hilltops and ridges that have clay and gravelly clay loams soils. It occurs in *Eucalyptus accedens* woodland and also in scrub with *E. drummondii*, *Dryandra nobilis* and *Beaufortia* sp.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|-------------|-------------|-------|-------------|---------------|-----------|
| 2* Dryandra | 25/11/87 | Wil | SF | Occasional | Rose |

Will Shire of Williams
* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

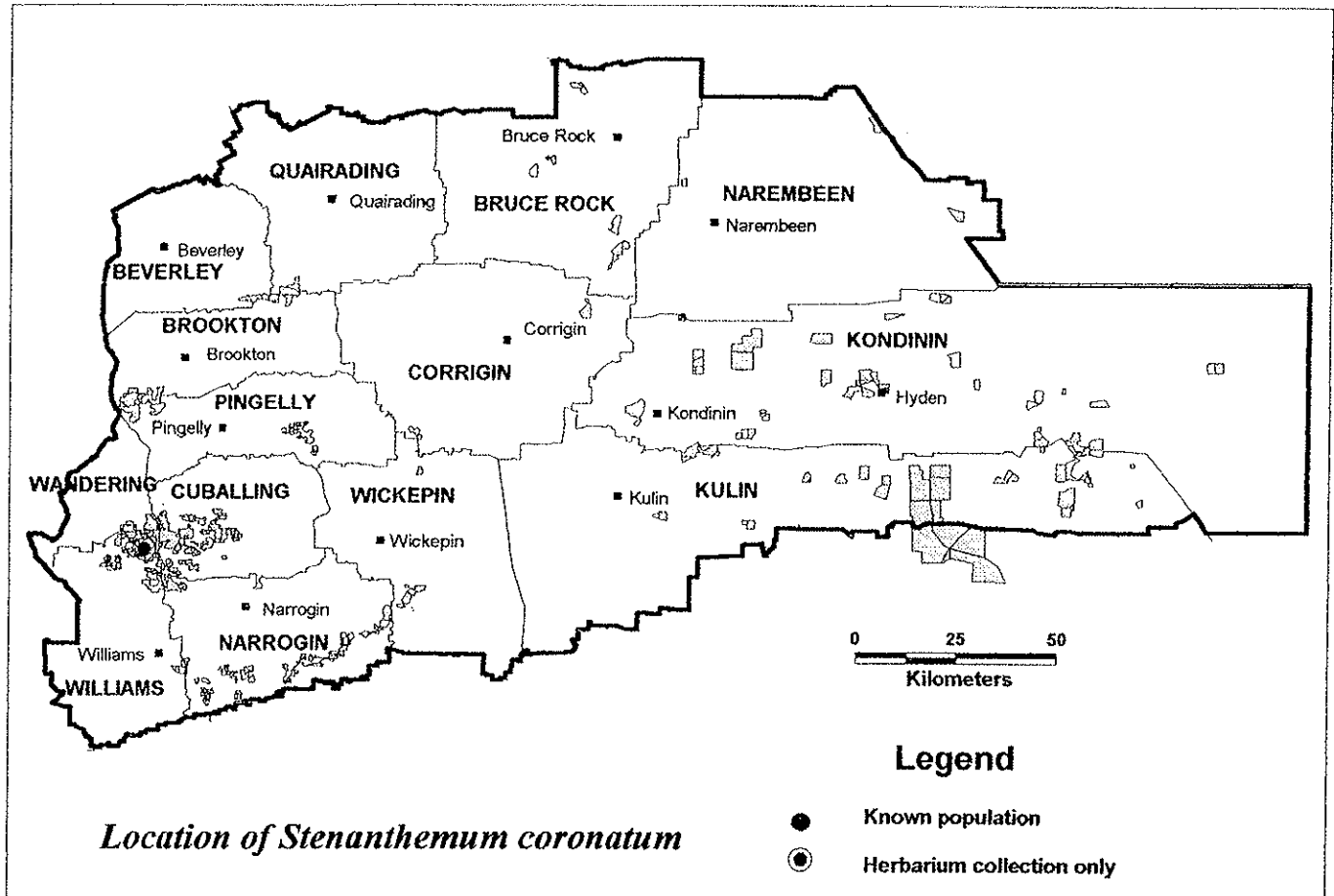
Management Requirements

- Protect the location of population 2 during forest management operations.

Research Requirements

- Obtain location information for population number 2. Survey and relocate population.
- When located, survey other areas of Dryandra State Forest, and conservation reserves within the known distribution, containing similar habitats.

References Rye (personal communication), Reisseck (1858).



Stenanthemum tridentatum (Steud.) Reissek

RHAMNACEAE

A more or less rounded prostrate shrub to 0.2 metres tall and 0.3 metre wide, intricately and densely branched with cream to yellow flowers. The family to which this species belongs has quite small flowers but often borne on showy heads, the calyx lobe are usually larger than the petals and not overlapping in the bud but meeting at the edges only; its petals alternating with the calyx lobes and usually smaller than them and frequently hooded in the upper part and hiding the stamens which are placed in front of the petals.

Flowering period: ?- July - October- ?

Distribution and Habitat in the Narrogin District

Known from five scattered localities from Gunyidi to West River. In the Narrogin District it is known to occur within the Tutanning Nature Reserve. Its preferred habitat is sand among *Allocasuarina*, or lateritic clay with scrub mallee and *Melaleuca uncinata*

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|--------------|-------------|-------|-------------|---------------|-------------|
| 1* Tutanning | 20/09/62 | Pin | NR | ? | George A. S |

Pin Shire of Pingelly

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

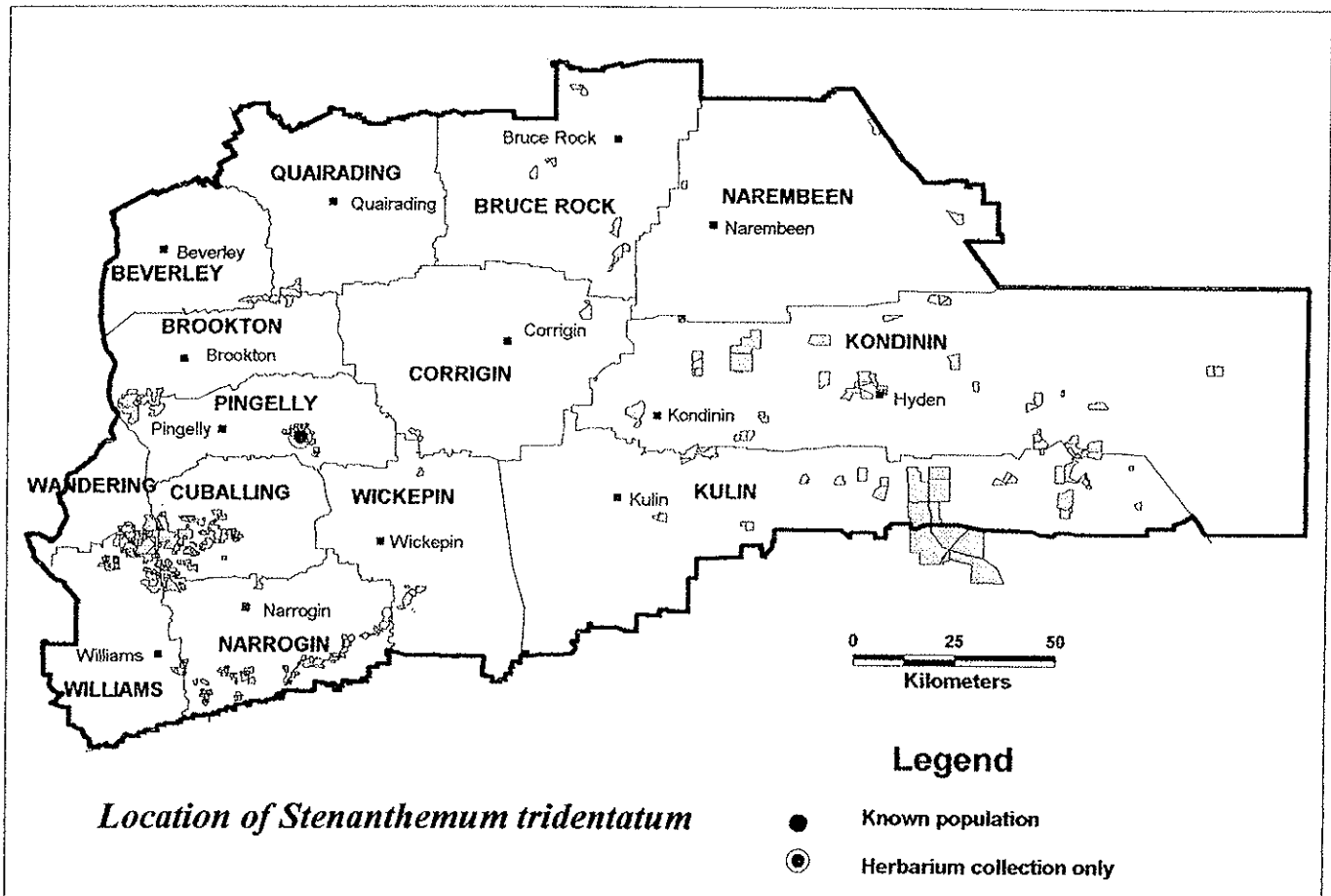
Management Requirements

– Nil until population is relocated.

Research Requirements

- Survey to relocate populations 1 at Tutanning. Record plant number and habitat.
- When relocated survey for new populations on adjacent conservation reserves with similar habitat.

References Gardner (1978).



Stylidium neglectum Mildbr.

STYLIDIACEAE

The Neglected Trigger Plant is a creeping plant forming compact colonies up to 1 square metre in area of small terminal rosettes are supported by stems bearing adpressed leaves scattered along their length. The stems are held high above the soil surface on prop-roots, the inflorescences arising from the terminal rosettes and forming a cluster of small laterally-paired flowers without throat appendages. The flowers are variable in colour (white to various shades of pink with darker reddish throat markings) from one clump of plants to the next. Plants in full sunlight are generally smaller leaved while those in heavy shade produce larger and longer leafy growth.

Flowering period: November-December.

Distribution and Habitat in the Narrogin District

Occurs from Merredin southwards to Holt Rock on brown gritty loam, over sheet granite. It prefers the outer margins of granite sheet outcrop apron, in areas where moisture is retained the longest. Occurs with *Borya nitida*, *Acacia* sp. and *Allocasuarina* sp. *Stylidium dielsianum* may be found in the slightly higher and drier soil areas.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|---------------------------|-------------|-------|-------------|---------------|------------------|
| 1* Hyden east | 24/11/93 | Kon | RVM | ? | Locally abundant |
| 3* Hyden west | 24/11/93 | Kon | RVM | ? | Unknown. |
| 4* Hyden- Rav. Road | 24/11/93 | Kon | RVM | ? | Unknown. |
| 5* Hyden Rav. Road | 25/11/93 | Kon | RVM | ? | Unknown. |
| 6* Hyden Rav. Road | 25/11/93 | Kon | RVM | ? | Locally abundant |
| 7* Hyden Rav. Road | 24/11/93 | Kon | RVM | ? | Locally abundant |
| 8* Holt Rock | 25/11/93 | Kul | RVM | ? | Locally abundant |
| 9* Duck Rock west Road | 25/11/93 | Kon | RVS | ? | Unknown. |

Kon Shire of Kondinin

Kul Shire of Kulin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

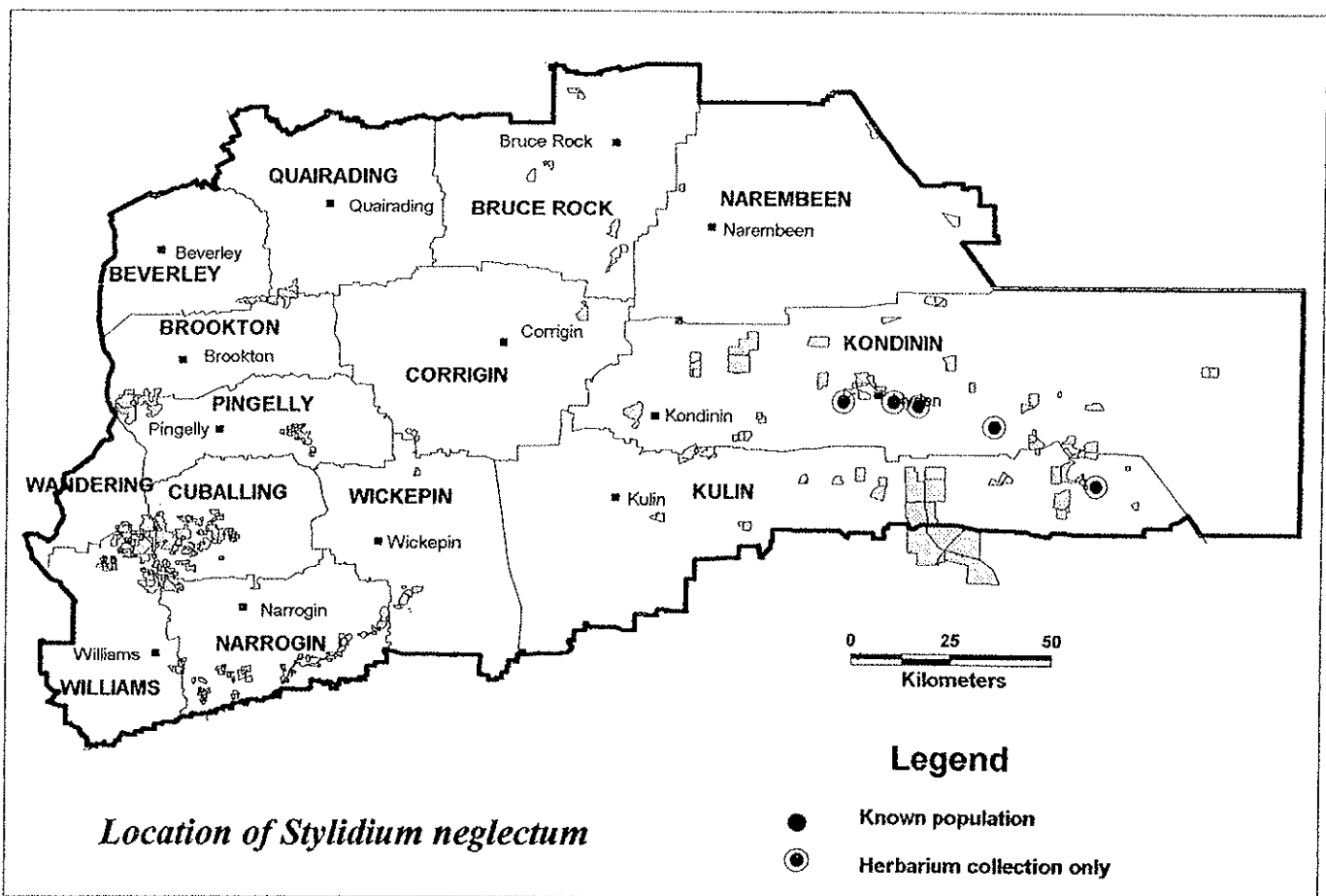
Management Requirements

- Monitor known populations occasionally.

Research Requirements

- Survey to relocate populations 3, 4, 5 and 9 to confirm numbers.
- Survey for new populations on adjacent conservation reserves with similar habitat in the Hyden, Holt Rock and Forrestania area.

References Lowrie (Personal communication).



Tetratheca retrorsa Thompson

TREMANDRACEAE

A sparsely-leaved spreading shrub to 1.5 metres high with the stems branching in the upper part and the stock slender. The stems are variable in width, with the older stout and younger more slender, cylindrical and rather grey-green, some hairless others brown with hairs 1.5 mm long. The lower stems have dense dark-reddish-coloured hair over 2 mm long. The leaves are alternate, nearly 20 mm long, often appearing linear owing to revolute leaf margins, hairless or some stiff hairs near an acute apex. The single flower occurs in the leaf axil and is dark pink. Bracts number 1 to several, up to 1 mm long and are dark brown. The peduncles are 7-16 mm long, pale-coloured, usually hairless. The 5 petals are 8-11 mm long. The fruit is 8-9 mm long with a very short stalk. The seeds are 4 mm long, with a small point at the base and a few hairs at the apex. The species name refers to the leaves which are recurved slightly backwards.

Flowering period: October

Distribution and Habitat in the Narrogin District

Known from two locations, Monks Well Gully at the southern end of Wongan Hills and at the Tutanning Nature Reserve. At Tutanning the plant is recorded as growing "among rocks on breakaway with *Eucalyptus accedens*".

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|--------------|-------------|-------|-------------|---------------|-----------|
| 1* Tutanning | 20/09/62 | Pin | NR | ? | Royce |

Pin Shire of Pingelly
* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

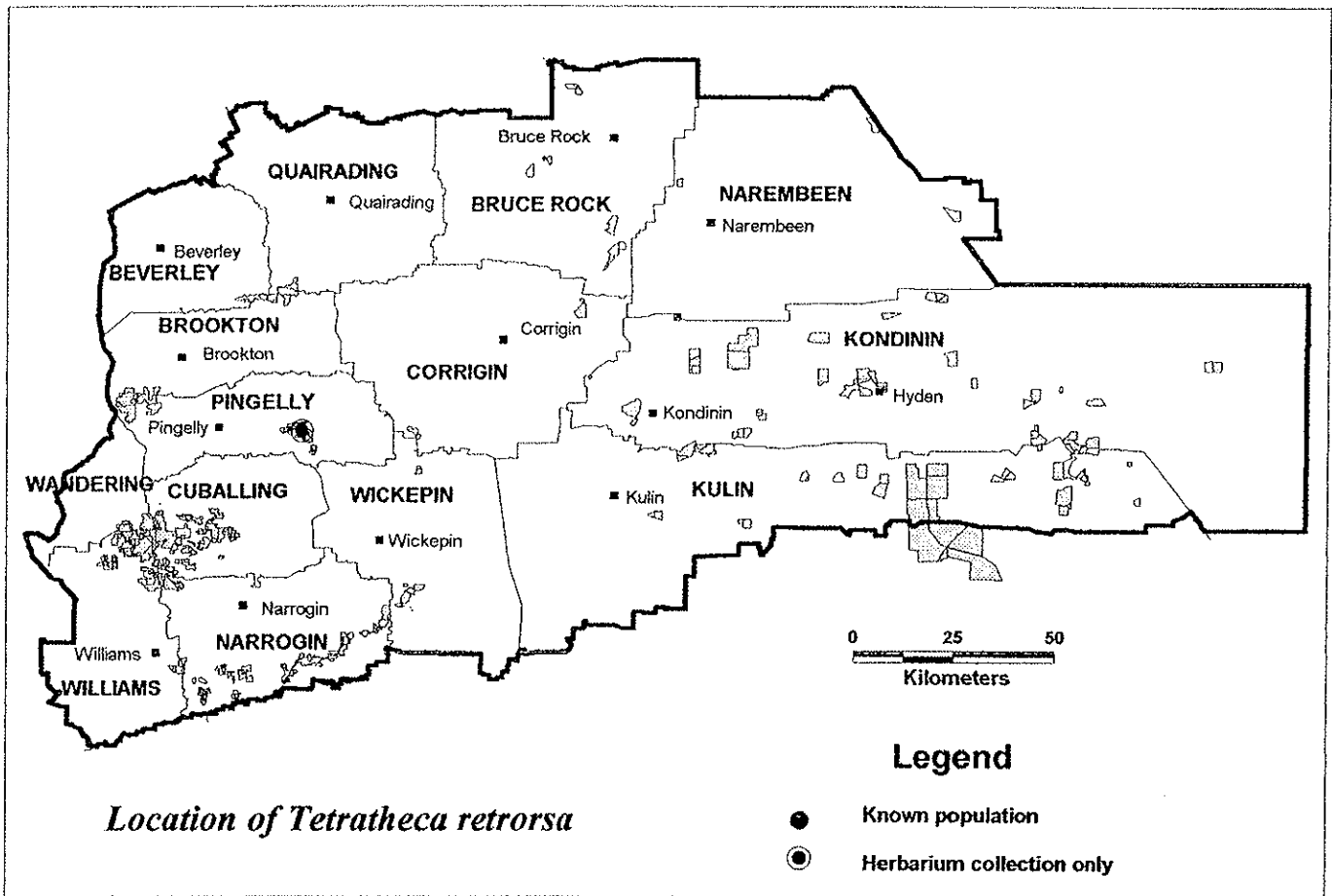
Management Requirements

- Consider changing to priority two status.

Research Requirements

- Survey to locate population 1 or new populations on "laterite-breakaways in the Tutanning Nature Reserve.

References Thompson (1976).



Thysanotus tenuis Lindley

LILIACEAE

A fringed lily with a small rootstock and tuberous roots. The tubers have short 3-4 cm long, 4 mm wide cylindrical stalk. The 15-18 cm long leaves are green, annual, 3-4, flat at the base, almost cylindrical above with the lower margins fringed with hairs. The 20-24 cm long flower cluster is branched in two's. Individual flower stalks are 6-7 mm long, jointed at the base. Perianth segments are about 10 mm long. Petals are almost white, elliptic, about 3.5 mm wide. 6 stamens. The 3.5-4 mm long style is straight to slightly curved. Seeds almost spherical and about 1 mm diameter. Distinguished by the flower stalks being twice divided in a very regular manner.

Flowering period: September - October.

Distribution and Habitat in the Narrogin District

Known from an area extending from Dumbleyung to Northam. Four populations occur in the Narrogin District, two near Tincurrin and one near Pingelly and Dryandra. Its occurs in depressions in low woodland dominated by eucalypts, with occasional acacias in sandy - clayey soils, sometimes in Jam - Sheoak and open Wandoo - Jam vegetation.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Collector |
|--------------|-------------|-------|-------------|---------------|-----------|
| 2* Pingelly | 10/08/68 | Pin | ? | ? | Brittan |
| 3* Tincurrin | 26/10/58 | Wic | ? | ? | Brittan |
| 4* Tincurrin | 26/10/58 | Wic | ? | ? | Brittan |
| 7* Dryandra | ? | Wil | SF | ? | ?? |

Pin Shire of Pingelly

Wic Shire of Wickepin

Wil Shire of Williams

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

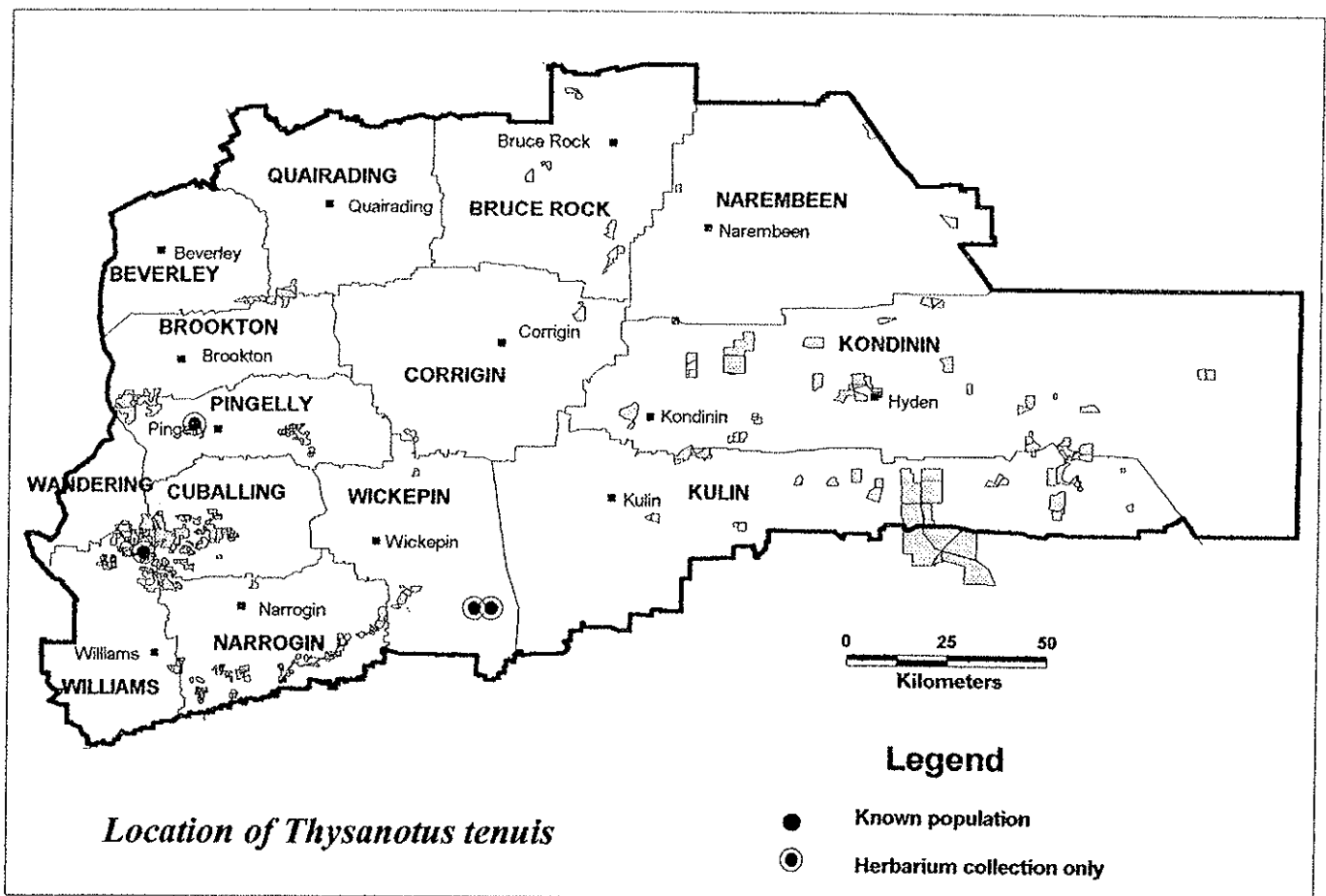
Management Requirements

- Consider change of status to Priority Two. The most recent collection of this plant was 26 years ago by Brittan at Pingelly.

Research Requirements

- Survey to relocate all the Narrogin populations. When relocated record habitat and numbers.
- Survey opportunistically, for new populations on conservation reserves with similar habitat.

References Lindley (1838), Benth (1878), Cooke (1987).



Verticordia gracilis George

MYRTACEAE

A shrub to 30 cm tall with one to several basal stems. The 2-4 mm long leaves are oblong, semi-cylindrical, and blunt. The floral leaves similar to stem leaves. The bright red fading to pink flowers are erect and in level groups at apex of plant. The hypanthium is more hairy and the petals more tooth edged rather than fringed. It is similar to *V. pritzelii* however, is more slender and spindly in habit with more slender flower stalks. The species name refers to the slender stems and flower stalks.

Flowering period: October - December.

Distribution and Habitat in the Narrogin District

V. gracilis is scattered in occurrence, its habitat is common and has a wide distribution from near Merredin to Hyden and east to Mount Holland. It is found in heath with other *Verticordia*, *Eucalyptus*, *Dampiera* and *Melaleuca* species. The plant prefers yellow sands with perhaps an admixture of laterite gravel.

Conservation Status

Current: Priority 3

Populations Known in the Narrogin District

| Population | Last Survey | Shire | Land Status | No. of plants | Condition |
|-----------------|-------------|-------|-------------|---------------------|---------------|
| 1 Lake O'Connor | 05/11/93 | Kon | RVS | Nil Found | Not relocated |
| 6 Dragon Rocks | 09/12/93 | Kul | NR | Common | Undisturbed |
| 7 Dragon Rocks | 1991 | Kul | NR | 3000+ Occasional | Not known |

Kon Shire of Kondinin

Kul Shire of Kulin

* population known only as Herbarium record

Response to Disturbance

Unknown.

Susceptibility to *Phytophthora* Dieback

Unknown.

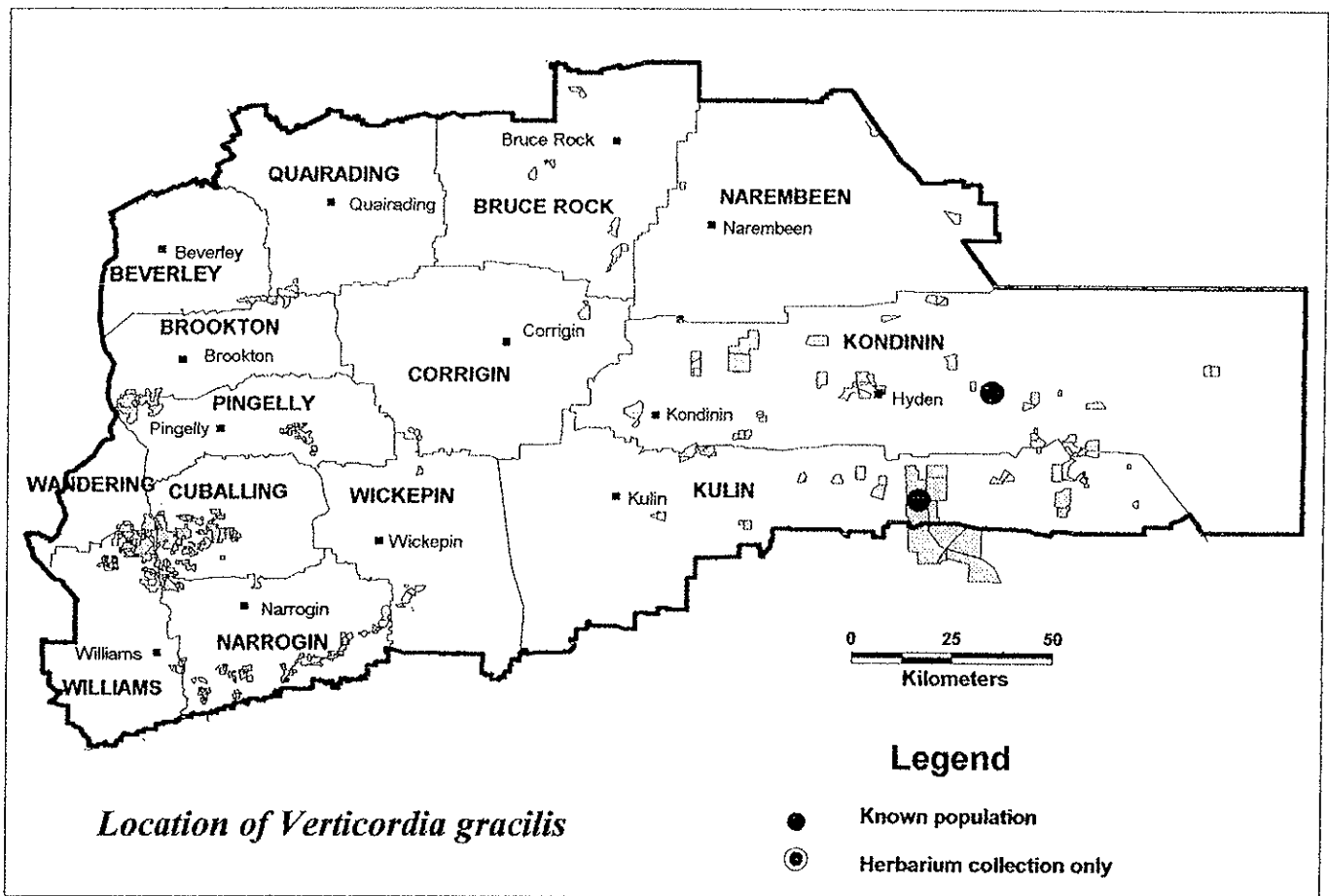
Management Requirements

- Monitor known populations occasionally.

Research Requirements

- Survey opportunistically on conservation reserves within its known distribution on yellow sand with heath vegetation.

References George (personal communication), George (1991).



D. Priority Four Taxa

D. PRIORITY FOUR SPECIES KNOWN FROM THE NARROGIN CALM DISTRICT

Banksia meisneri var. *ascendens*
Caladenia integra
Calothamnus rupestris
Darwinia sp. *Dryandra* (GJ Keighery 9295)
Darwinia thymoides subsp. *St Ronans* (J Alford and G J Keighery 64)
Daviesia crassa ms.
Daviesia oxylobium ms.
Daviesia purpurascens
Drosera graniticola
Dryandra shanklandiorum
Eremophila biserrata
Eremophila serpens
Eucalyptus aspersa
Eucalyptus caesia subsp. *caesia*
Eucalyptus exilis
Eucalyptus georgei subsp. *fulgida*
Eucalyptus latens
Gastrolobium callistachys
Gastrolobium glabratum ms.
Gastrolobium ovalifolium
Gastrolobium tomentosum
Gonocarpus intricatus
Grevillea astericosa
Haloragodendron glandulosum
Hemigenia platyphylla
Hibbertia montana
Melaleuca fissurata
Microtis media subsp. *quadrata*
Nemcia stipularis
Pomaderris bilocularis
Rinzia crassifolia
Sowerbaea multicaulis
Stylidium expeditionis
Stylidium tenuicarpum
Templetonia drummondii
Verticordia integra
Verticordia lindleyi subsp. *purpurea*
Verticordia multiflora subsp. *multiflora*
Wurmbea drummondii
Xanthorrhoea brevistyla

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

An initial indication of those taxa most in need of attention for a specific management or research requirement can be determined from Table 1. Each of the 32 taxa dealt with in Part Two was ranked on a scale of 1 to 3 under 20 categories identified as potential threats or management / research requirements (Table 1). A high degree of threat or need for action was allocated a score of 3. Those with a lower threat or need for action were scored 1 or 2. Where there was no threat, or action was inappropriate, a dash (-) was used. Ranking the categories also provided an initial indication of the most critical threats / management requirements in the District.

Table 2 lists 30 species of Declared Rare Flora in priority order according to their urgency requirement for management action. This will enable Narrogin District staff to allocate resources where they are most urgently required. Species with a high ranking score are considered most threatened and/or most in need of action. The ranking system used was based on CALM Policy Statement No. 50 *Setting priorities for the Conservation of Western Australia's Threatened Flora and Fauna*.

Each taxon ranked had the possibility of scoring 95 points. The taxon with the highest score is considered to require the highest priority for management and research in the Narrogin District. This ranking system is to be used as a guide only for management, because it is essential that lower ranked species do not become more threatened or individual populations of Declared Rare Flora are not jeopardised while intensive management actions are occurring on the higher priority species.

The two presumed extinct taxa, *Thomasia gardneri* and *Leucopogon marginatus*, were not ranked.

Table 1. Narrogin District Declared Rare Flora Scored 1-3 According to the Degree of Threat or Urgency for Management and Research Action.

| | Mapping & Resurvey Populations | Survey for New Populations | Liaise With Landholders | Acquire Land/Consolidate in Conservation Reserve | Checking/Install Roadside Marking of Pop'n Reg'd | Fencing of Population Required | Annual Inspection of Existing Fences | Liaise with Mining Companies | Weeds Control | Recreation Threat | Collect Seed/Cuttings for Long Term Storage | Propagation Studies Required | Consolidate in Botanic Gardens | Implement Recovery Plan/ Interim Mgmt Guidelines | Prepare Recovery Plan/ Interim Guidelines | Fire Research | Disturbance Studies | Determine Taxonomy or Describe Species | Control Rabbits | P.C. Infection or High Risk of Disease |
|--|--------------------------------|----------------------------|-------------------------|--|--|--------------------------------|--------------------------------------|------------------------------|---------------|-------------------|---|------------------------------|--------------------------------|--|---|---------------|---------------------|--|-----------------|--|
| <i>Allocasuarina fibrosa</i> | 3 | 2 | 2 | 3 | - | - | 2 | - | - | - | 3 | 3 | 3 | - | 3 | 2 | - | - | 3 | 3 |
| <i>Allocasuarina tortiramula</i> | 3 | 3 | 3 | - | - | - | - | - | - | - | 3 | 3 | 3 | - | 3 | 3 | - | - | 3 | 3 |
| <i>Banksia cuneata</i> | 1 | 2 | 1 | 1 | - | - | 1 | - | 2 | - | 1 | 1 | 3 | 1 | - | 2 | - | - | 1 | 1 |
| <i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> | 3 | 3 | - | 1 | - | - | - | 1 | - | - | 2 | 2 | 2 | - | 3 | 2 | - | - | 3 | 3 |
| <i>Boronia revoluta</i> | 2 | 2 | - | 1 | - | - | - | 1 | - | - | 1 | 1 | 1 | - | 1 | 2 | 2 | - | 3 | 3 |
| <i>Calectasia arnoldii</i> ms. | 3 | 2 | 3 | 3 | - | - | - | - | - | - | 3 | 3 | 3 | - | 3 | 2 | 2 | 1 | 3 | 3 |
| <i>Catadenia hoffmanni</i> ms. | 2 | 2 | - | 2 | - | - | - | - | - | 2 | 3 | 3 | 3 | - | 3 | 2 | 2 | 1 | 3 | 3 |
| <i>Conostylis rogeri</i> | 1 | 1 | - | - | - | - | - | - | - | - | 3 | 3 | 3 | - | 1 | 2 | 2 | - | 1 | 3 |
| <i>Conostylis seorsiflora</i> subsp. <i>trichophylla</i> | 1 | 2 | 1 | 2 | 2 | 1 | 2 | - | 1 | - | 3 | 3 | 3 | - | 3 | 2 | 2 | - | 1 | 3 |
| <i>Darwinia carnea</i> | 2 | 2 | 1 | 1 | - | - | 1 | - | 2 | - | 2 | 3 | 1 | 1 | - | 1 | 1 | - | 1 | 2 |
| <i>Eremophila veneta</i> | 2 | 2 | 2 | 2 | - | - | - | - | 2 | - | 2 | 2 | 2 | 1 | - | 2 | 2 | 1 | 3 | 2 |
| <i>Eremophila caerulea</i> subsp. <i>merrallii</i> ms. | 1 | 1 | 1 | - | 1 | - | - | - | 1 | - | 2 | 3 | 3 | 1 | - | 3 | 3 | - | 3 | 2 |
| <i>Eremophila inflata</i> | 1 | 2 | 1 | - | 1 | - | - | 1 | - | - | 2 | 2 | 2 | - | 3 | 2 | 2 | - | 3 | 2 |
| <i>Eremophila racemosa</i> | 1 | 1 | 1 | - | 1 | - | - | 1 | 2 | - | 2 | 2 | 2 | - | 3 | 1 | 1 | - | 3 | 2 |
| <i>Eremophila verticillata</i> | - | 2 | - | 2 | - | - | - | - | - | - | 2 | 2 | 2 | - | 3 | 2 | 2 | - | 3 | 2 |
| <i>Eucalyptus olivacea</i> ms. | 3 | 2 | - | 3 | 2 | - | - | - | - | - | 2 | 2 | 2 | - | 3 | 3 | 3 | 1 | 1 | 3 |
| <i>Eucalyptus steedmanii</i> | 2 | 3 | - | 2 | 3 | - | - | 1 | - | - | 3 | 3 | 3 | - | 3 | 2 | 2 | - | 3 | 3 |
| <i>Grevillea dryandroides</i> subsp. <i>hirsuta</i> | 2 | 2 | 1 | 2 | 2 | - | - | - | 1 | - | 3 | 3 | 3 | - | 3 | 3 | 3 | - | 2 | 2 |
| <i>Grevillea involuocrata</i> | 2 | 2 | 1 | 3 | 2 | - | - | - | - | - | 3 | 3 | 3 | - | 3 | 3 | 3 | - | 3 | 2 |
| <i>Grevillea scapigera</i> | 1 | 1 | 1 | 1 | 1 | - | - | - | 1 | - | 2 | 2 | 2 | 1 | - | 2 | 2 | - | 2 | 2 |

2. Management and Research Actions

Overall rankings of Declared Rare Flora taxa based on the 21 categories of threat, management and research requirements (Table 1) are shown in Table 2. These data suggest that currently seven taxa warrant immediate management and research action. These are:

1. *Darwinea carnea*
2. *Grevillea scapigera*
3. *Verticordia fimbrialepis* subsp. *fimbrialepis*
4. *Eremophila veneta* ms.
5. *Eremophila caerulea* subsp. *merrallii* ms.
6. *Banksia cuneata*
7. *Hakea aculeata*

2.1 Mapping and re-survey of known populations

Detailed mapping of population size, area, and location of individual plants will assist in providing information on survival trends, population dynamics, plant longevity and natural recruitment rates for individual populations and species. The following taxa have the highest priority for population survey:

| | |
|--|--|
| <i>Banksia cuneata</i> | <i>Lechenaultia laricina</i> |
| <i>Conostylis rogeri</i> | <i>Pultenaea pauciflora</i> |
| <i>Conostylis seorsiflora</i> subsp. <i>trichophylla</i> | <i>Verticordia fimbrialepis</i> subsp. <i>fimbrialepis</i> |
| <i>Eremophila caerulea</i> subsp. <i>merrallii</i> ms. | <i>Verticordia staminosa</i> subsp. <i>cylindracea</i> |
| <i>Eremophila inflata</i> | var. <i>cylindracea</i> |
| <i>Eremophila racemosa</i> | |
| <i>Grevillea scapigera</i> | |

2.2 Location of new populations

Many Declared Rare Flora taxa in the Narrogin District have not been surveyed adequately on conservation reserves or other areas of remnant vegetation. The location of additional populations may reduce the urgency for intensive management and will ensure funds are directed to taxa most in need. Species with a high priority for additional surveys are:

| | |
|--|--|
| <i>Conostylis rogeri</i> | <i>Pultenaea pauciflora</i> |
| <i>Eremophila caerulea</i> subsp. <i>merrallii</i> ms. | <i>Verticordia fimbrialepis</i> subsp. <i>fimbrialepis</i> |
| <i>Eremophila racemosa</i> | <i>Thomasia gardneri</i> |
| <i>Grevillea scapigera</i> | |

2.3 Liaison with other Landowners

Cooperation with private landowners, Local Authorities and other Government Authorities is essential to ensure the continued survival of many Declared Rare Flora populations in the District. CALM will continue to provide advice to landowners for the management of populations on land not under CALM control. Land managers have a statutory requirement to ensure their operations do not damage populations. Species of Declared Rare Flora with a high priority for liaison are:

| | |
|--|--|
| <i>Banksia cuneata</i> | <i>Grevillea involuocrata</i> |
| <i>Darwinea carnea</i> | <i>Grevillea scapigera</i> |
| <i>Eremophila caerulea</i> subsp. <i>merrallii</i> ms. | <i>Lechenaultia laricina</i> |
| <i>Eremophila inflata</i> | <i>Thomasia montana</i> |
| <i>Eremophila racemosa</i> | <i>Verticordia fimbrialepis</i> subsp. <i>fimbrialepis</i> |
| <i>Grevillea dryandroides</i> subsp. <i>hirsuta</i> | |

2.4 Acquire land and consolidate populations on conservation reserves

Acquisition of land by donation, exchange or purchase may be required, where extensive field surveys have revealed species are not well represented on conservation reserves. Species with a high priority for securing populations within the conservation reserve system are:

Banksia cuneata
Banksia sphaerocarpa var. *dolichostyla*
Boronia revoluta
Darwinea carnea
Grevillea scapigera

Rhizanthella gardneri
Verticordia fimbrialepis subsp. *fimbrialepis*
Verticordia staminosa subsp. *cylindracea*
var. *cylindracea*

2.5 Research

2.5.1 Taxonomy and formal descriptions

A number of taxa have not yet been formally described and are referred to by their 'manuscript' or phrase name. The following taxa require formal description:

Calectasia arnoldii ms.
Caladenia hoffmanii ms.
Eremophila caerulea subsp. *merrallii* ms.

Eremophila veneta ms.
Eucalyptus olivacea ms.

2.5.2 Fire research

Little research has been conducted within the District on the fire sensitivity and post-fire regeneration of threatened flora taxa. Taxa confined to single or small populations may require fire exclusion or protection from fire until their fire response is known.

Lechenaultia pulvinaris is one species that appears to benefit from fire and should be given priority within the District for fire regeneration studies.

The regeneration response of *Eremophila racemosa* and *Eremophila inflata* following the Forrestania fire, in January 1994, needs to be determined.

2.5.3 Short lived and disturbance species

Some species are favoured by disturbance, either because they cannot compete with associated species in undisturbed vegetation, or disturbance is essential for their natural recruitment. Species that may be disturbance opportunists requiring further investigation are:

Darwinea carnea
Eremophila racemosa

Lechenaultia pulvinaris

2.5.4 Population decline

Research is required to assess the factors that may be causing decline of individual species and populations. Factors that may be causing decline are weeds, human activities, drought intolerance, lack of pollinating agents, inappropriate fire regimes, increasing salinity, rising ground water tables and the decline of associated species that provide shelter. The following taxa are considered to be in decline in the Narrogin District:

Banksia cuneata
Darwinea carnea
Eremophila caerulea subsp. *merrallii* ms.
Eremophila inflata
Eremophila veneta ms.

Grevillea scapigera
Hakea aculeata
Lechenaultia pulvinaris
Thomasia montana
Verticordia fimbriolepis subsp. *fimbriolepis*

2.6 Population Field Marking (roadsides and other public utilities)

Some populations need field marking to ensure their continued protection. These populations are usually located along linear reserves (road and rail) and are sometimes associated with other public utilities such as telephone cables, power lines and water pipelines. Populations occurring within these areas may be vulnerable to damage or destruction by maintenance and construction operations. Taxa that require marking or ensuring markers are present are:

Eremophila caerulea subsp. *merrallii* ms.
Eremophila inflata
Eremophila racemosa

Grevillea scapigera
Verticordia fimbriolepis subsp. *fimbriolepis*

2.7 Fencing/Grazing control

2.7.1 Fencing requirements

Populations occurring on private property are generally required to be fenced when threatened by grazing domestic stock. In some cases landowners have excluded stock from remnant bushland where populations occur, or CALM has provided fencing material as part of a formal agreement with the landowner to protect specific populations. Damage by rabbits also needs assessment and the erection of rabbit-proof fences may be necessary in some instances. Some populations infested with rabbits on conservation reserves may need to be fenced as part of the management of populations. Species and populations with a high priority for fencing are:

Hakea aculeata Population numbers 18B
and C, 20 and 21

Conostylis seorsiflora subsp. *trichophylla*
Population number 1
Lechenaultia laricina

2.7.2 Inspection of existing fences

Most populations on private property are vulnerable to grazing and are often only protected from damage by a fence. The long term protection of these populations rely on the good will of the landowner to maintain fences in good condition. It is necessary to continue to maintain contact with landowners to ensure fences remain intact. Those populations requiring an inspection at least annually are:

Banksia cuneata
Darwinea carnea

Thomasia montana population number 4

Other populations that need less frequent inspection are:

Allocasuarina fibrosa
Conostylis seorsiflora subsp. *trichophylla*

Hakea aculeata
Lechenaultia pulvinaris

2.8 Liaison with mining companies

The major mining activities are situated in the eastern portion of the District, at Forrestania, about 100 kilometres east of Hyden. A number of threatened flora populations occur in the area and these taxa have generally been poorly surveyed. In some instances populations may be threatened by mining operations. Such activities include exploration, mine site establishment, provision of services (road construction and maintenance and power supplies), and recreational pursuits of mine workers. Liaison between mining companies, CALM, the Department of Minerals and Energy, the Department of Environmental Protection and the Environmental Protection Authority is necessary. Taxa most at risk are:

Banksia sphaerocarpa var. *dolichostyla*
Boronia revoluta
Eremophila inflata

Eremophila racemosa
Eucalyptus steedmanii

Mining by Local Authorities for gravel will require individual population management. Adequate protection of these populations should be achieved by direct liaison with the appropriate Local Authority.

2.9 Weed control

Competition from introduced grasses and broad-leaf weeds can significantly reduce recruitment of most native plant species. Weeds are prevalent on most disturbed roadside verges. Veldt grass invasion can affect most roadside populations. The invasive *Ptilotus polystachyus* (mulla mulla) may be a potential future threat for populations on roadsides. Methods of weed control for specific taxa require research. Taxa that are considered in need of protection from weeds are:

Eremophila caerulea subsp. *merrallii* ms.
Grevillea dryandroides subsp. *hirsuta*
Grevillea scapigera

Conostylis seorsiflora subsp. *trichophylla*
Lechenaultia pulvinaris
Verticordia fimbrelipis subsp. *fimbrelipis*

Other species where weeds may be a potential threat to individual populations are:

Banksia cuneata
Darwinea carnea
Eremophila veneta ms.
Eremophila racemosa

Hakea aculeata
Pultenaea pauciflora
Verticordia staminosa subsp. *cylindracea*
var. *cylindracea*

2.10 Recreation usage

To protect populations from illegal flora picking and seed collecting, the management of roadside populations requires that the confidentiality of precise population locations is maintained.

Other recreational based activities are usually concentrated on granite rock outcrops and salt lakes. These areas often support unique and fragile ecosystems. The management of land for recreation should be carefully planned when threatened plant populations are considered at risk from this activity.

Taxa that may be at risk from recreational based activities are:

Caladenia hoffmanii ms.
Myriophyllum petraeum

Pultenaea pauciflora

2.11 Seed collection and storage

Collection and long-term storage of germplasm from threatened taxa provides a source for propagation and translocation and the long term storage of genetic material. Priority for collection will depend on the species' priority for management (Table 1). Within ten years, all threatened taxa occurring in the District should have germplasm collected and stored in CALM's Threatened Flora Seed Centre.

2.12 Propagation and Translocation

Those species that occur in small numbers, or are known from one to three populations should be assessed for propagation and translocation. Propagated material may be planted back to enhance existing small populations, or introduced to new secure sites. Those species that are currently being translocated or may require propagation and translocation are :

Banksia cuneata
Boronia revoluta
Darwinia carnea
Grevillea scapigera

Hakea aculeata
Pultenaea pauciflora
Verticordia fimbriolepis subsp. *fimbriolepis*

2.13 Recovery Plans and Interim Recovery Plans

Recovery Plans for *Banksia cuneata* and *Grevillea scapigera* are currently being implemented by the District, with coordination being provided by two Recovery Teams. Interim Recovery Plans for the following species occurring in the District are being prepared:

Darwinea carnea
Verticordia fimbrelipis subsp. *fimbrelipis*

Eremophila veneta ms.

In addition to the species already covered by a Recovery Plan or draft Interim Recovery Plan, the threatened taxon in the District having highest priority for recovery and funding for management and further research is:

Hakea aculeata

2.14 Fire Management

All threatened plant populations in the Narrogin District need to be excluded from prescribed burning, except where approval is given for a research project aimed at providing information on appropriate fire regimes. Every opportunity should be made to obtain fire response data from threatened taxa accidentally burnt during wildfires. Species considered be a high priority for fire management research are:

Banksia cuneata
Darwinea carnea

Eremophila racemosa
Lechenaultia pulvinaris

Other fire management considerations are:

- i) Where possible all threatened taxa should be protected from wildfires.
- ii) Declared Rare Flora populations need protection during the construction and maintenance of firebreaks.

iii) District Declared Rare Flora location plans need to be maintained and checked for populations of Declared Rare Flora in the event of a fire in specific areas.

2.15 Small population size and vulnerability

A number of species of Declared Rare Flora have very small population sizes making them particularly vulnerable to localised disturbance. Species at risk in some or all of their known populations are:

Allocasuarina tortiramula
Banksia cuneata
Caladenia hoffmanii ms.
Darwinea carnea
Eremophila veneta ms.
Eremophila caerulea subsp. *merrallii* ms.
Grevillea involuocrata
Grevillea scapigera
Lechenaultia laricina
Pultenaea pauciflora
Thelymitra stellata
Verticordia fimbriolepis subsp. *fimbriolepis*
Verticordia staminosa subsp. *cylindracea* var. *cylindracea*

2.16 Rabbit control

Protection of individual populations on rabbit-prone sites, for example, sandy soils, will require protection through the erection of rabbit-proof fencing, or on-going control by 1080 oat-laying. Those species with a high priority for ongoing protection from rabbits are:

| | |
|--|---|
| <i>Banksia cuneata</i> | <i>Verticordia staminosa</i> subsp <i>cylindracea</i> |
| <i>Conostylis rogeri</i> | var. <i>cylindracea</i> |
| <i>Conostylis seorsiflora</i> subsp. <i>trichophylla</i> | <i>Lechenaultia pulvinaris</i> |
| <i>Darwinea carnea</i> | |

2.17 *Phytophthora* spp. (Dieback)

Phytophthora cinnamomii has been isolated within the western portion of the District in one population of *Banksia cuneata*. The potential to introduce exotic plant diseases into populations must be taken into account and any management must be carried out using CALM hygiene guidelines to prevent the introduction of exotic plant diseases.

Little is known about the impact of *Phytophthora* spp. infections on most of the threatened taxa occurring in the Narrogin District. Based on current knowledge, it is unlikely that *Phytophthora* will become established except in high rainfall areas or in particular moist sites. Because the risk of infection is not known, it is necessary to ensure adequate hygiene measures, for example keeping vehicles and machinery clean, to eliminate possible infection of new sites within the District.

Until more is known about the impact of *Phytophthora* within the District, the only direct management actions to be undertaken are:

i) The foliar spraying of Phosphite at prescribed intervals at *Banksia cuneata* population number 8.

ii) Any suspect *Phytophthora* infections within populations need to have samples taken for analysis.

iii) The completion and maintenance of a register, listing species occurring in the District that are susceptible to *Phytophthora*.

Table 2. Narrogin District Declared Rare Flora Ranked In Priority Order for Protection and Management.

At March 1996

1. *Darwinea carnea*
2. *Grevillea scapigera*
3. *Verticordia fimbrialepis* subsp. *fimbrialepis*
4. *Eremophila veneta* ms.
5. *Eremophila caerulea* subsp. *merrallii* ms.
6. *Banksia cuneata*
7. *Hakea aculeata*
8. *Conostylis rogeri*
9. *Eremophila verticillata*
10. *Lechenaultia laricina*
11. *Rhizanthella gardneri*
12. *Conostylis seorsiflora* subsp. *trichophylla*
13. *Boronia revoluta*
14. *Verticordia staminosa* subsp. *cylindracea* var. *cylindracea*
15. *Calectasia arnoldii* ms.
16. *Thomasia montana*
17. *Grevillea involucrata*
18. *Allocasuarina fibrosa*
19. *Caladenia hoffmanii* ms.
20. *Thelymitra stellata*
21. *Lechenaultia pulvinaris*
22. *Grevillea dryandroides* subsp. *hirsuta*
23. *Allocasuarina tortiramula*
24. *Banksia sphaerocarpa* var. *dolichostyla*
25. *Pultenaea pauciflora*
26. *Eucalyptus steedmanii*
27. *Eucalyptus olivacea* ms.
28. *Myriophyllum petraeum*
29. *Eremophila inflata*
30. *Eremophila racemosa*

Table 3. Declared Rare and Poorly Known Flora in the Narrogin District as at 1996
Conservation Status Updated to December 1999

| DECLARED RARE FLORA | Conservation Code | | |
|---|-------------------|---|--------|
| A. Extant Taxa | | <i>Microcorys cephalantha</i> | P3 |
| <i>Allocasuarina fibrosa</i> | R | <i>Muelleranthus crenulatus</i> | P1 |
| <i>Allocasuarina tortiramula</i> | R | <i>Neofuscelia scabrosina</i> | P1 |
| <i>Banksia cuneata</i> | R | <i>Paraparmelia sammyi</i> | P1 |
| <i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i> | R | <i>Paraparmelia sargentii</i> | P1 |
| <i>Boronia revoluta</i> | R | <i>Stylidium rhipidium</i> | P3 |
| <i>Caladenia hoffmanii</i> ms. | R | <i>Stylidium sejunctus</i> ms. | P2 |
| <i>Calectasia arnoldii</i> ms. | R | <i>Symonanthus bancroftii</i> | R |
| <i>Conostylis rogeri</i> | R | <i>Verticordia multiflora</i> subsp. <i>solox</i> | P2 |
| <i>Conostylis seorsiflora</i> subsp. <i>trichophylla</i> | R | <i>Xanthoparmelia nashii</i> | P1 |
| <i>Darwinia carnea</i> | R | B. PRIORITY TWO TAXA | |
| <i>Eremophila caerulea</i> subsp. <i>merrallii</i> | P4 | <i>Acacia alocophylla</i> subsp. <i>compressa</i> ms. | P2 |
| <i>Eremophila inflata</i> (now <i>Calamohoreus inflatus</i>) | P4 | <i>Acacia arcuatilis</i> ms. | P2 |
| <i>Eremophila racemosa</i> | P4 | <i>Acacia asepala</i> ms. | P2 |
| <i>Eremophila veneta</i> ms. | R | <i>Acacia campylophylla</i> | P2 |
| <i>Eremophila verticillata</i> | R | <i>Acacia castanostegia</i> ms. | delete |
| <i>Eucalyptus olivacea</i> ms. | R | <i>Acacia concolorans</i> ms. | P2 |
| <i>Eucalyptus steedmanii</i> | R | <i>Acacia cowaniana</i> | P2 |
| <i>Grevillea dryandroides</i> subsp. <i>hirsuta</i> | R | <i>Acacia cuneifolia</i> ms. | P4 |
| <i>Grevillea involucrata</i> | R | <i>Acacia deflexa</i> | P3 |
| <i>Grevillea scapigera</i> | R | <i>Acacia heterochroa</i> subsp. <i>robertii</i> | P2 |
| <i>Hakea aculeata</i> | R | <i>Acacia insolita</i> subsp. <i>recurva</i> ms. | R |
| <i>Lechenaultia laricina</i> | R | <i>Acacia kerryana</i> | P2 |
| <i>Lechenaultia pulvinaris</i> | R | <i>Acacia tetraptera</i> ms. | delete |
| <i>Leucopogon marginatus</i> | R | <i>Acacia tuberculata</i> ms. | P2 |
| <i>Myriophyllum petraeum</i> | P4 | <i>Acacia undosa</i> | P3 |
| <i>Pultenaea pauciflora</i> | R | <i>Acrotriche patula</i> | P2 |
| <i>Rhizanthella gardneri</i> | R | <i>Amanita carneiphylla</i> | P2 |
| <i>Thelymitra stellata</i> | R | <i>Andersonia bifida</i> | P2 |
| <i>Thomasia montana</i> | R | <i>Andersonia carinata</i> | P2 |
| <i>Verticordia fimbriolepis</i> subsp. <i>fimbriolepis</i> | R | <i>Anigozanthos bicolor</i> subsp. <i>extans</i> | P3 |
| <i>Verticordia staminosa</i> subsp. <i>cylindracea</i> var. <i>cylindracea</i> | R | <i>Billardiera</i> sp. <i>Dryandra</i> (D.M. Rose 397) | P3 |
| A. PRIORITY ONE TAXA | | <i>Boronia capitata</i> subsp. <i>capitata</i> | R |
| <i>Acacia brachypoda</i> | R | <i>Chamaelucium croxfordiae</i> ms. | P2 |
| <i>Acacia caesariata</i> | P1 | <i>Daviesia elongata</i> subsp. <i>implexa</i> | P3 |
| <i>Acacia lanei</i> | P1 | <i>Daviesia rhizomata</i> | P2 |
| <i>Acacia sclerophylla</i> var. <i>teretiuscula</i> | P1 | <i>Dryandra cynaroides</i> | P4 |
| <i>Acacia tetraneura</i> ms. | P1 | <i>Dryandra epimicta</i> | P2 |
| <i>Caladenia caesarea</i> subsp. <i>transiens</i> ms. | P2 | <i>Dryandra erythrocephala</i> var. <i>inopinata</i> | P2 |
| <i>Conospermum scaposum</i> | P3 | <i>Dryandra meganotia</i> | P3 |
| <i>Cryptandra intonsa</i> | P1 | <i>Eucalyptus sparsicoma</i> | P2 |
| <i>Dampiera scaevolina</i> | P1 | <i>Gastrolobium densifolium</i> | P4 |
| <i>Eremophila adenotricha</i> | P1 | <i>Gonocarpus ericifolius</i> | P2 |
| <i>Eucalyptus loxophleba</i> x <i>wandoo</i> | P1 | <i>Grevillea crowleyae</i> | P2 |
| <i>Eucalyptus myriadena</i> subsp. <i>parviflora</i> | P1 | <i>Grevillea roycei</i> | P3 |
| <i>Eucalyptus subangusta</i> subsp. <i>virescens</i> | P1 | <i>Grevillea wittverri</i> | delete |
| <i>Grevillea hulfitzii</i> | P1 | <i>Isolepis australiensis</i> | P2 |
| <i>Grevillea marriottii</i> | P1 | <i>Lasiopetalum cardiophyllum</i> | P2 |
| <i>Jacksonia quairading</i> ms. | R | <i>Logania exilis</i> | P2 |
| | | <i>Loxocarya eludens</i> ms. (now <i>Kulinia eludens</i>) .. | P2 |
| | | <i>Microcorys tenuifolia</i> | P2 |
| | | <i>Millotia pilosa</i> | P2 |
| | | <i>Neofuscelia kondininensis</i> | P2 |
| | | <i>Persoonia hakeiformis</i> | P2 |

| | |
|--|--------|
| <i>Petrophile crispata</i> | P2 |
| <i>Phyllota gracilis</i> | P4 |
| <i>Podotheca pritzelii</i> | P2 |
| <i>Stylidium coatesianum</i> | P2 |
| <i>Thysanotus brachyantherus</i> | P2 |
| <i>Thysanotus cymosus</i> | P3 |
| <i>Trachymene anisocarpa</i> (now <i>T. croniniana</i>) | P3 |
| <i>Trachymene moorei</i> subsp. Tutanning (A.S. George 12867) (synonym of <i>T. cyanopetala</i>)..... | delete |
| <i>Triglochin stowardii</i> | P2 |
| <i>Verticordia bifimbriata</i> | P4 |

C. PRIORITY THREE TAXA

| | |
|---|--------|
| <i>Acacia anarthros</i> | P3 |
| <i>Acacia ancistrophylla</i> var. <i>perarcuata</i> | P3 |
| <i>Acacia brachyphylla</i> var. <i>recurvata</i> | P3 |
| <i>Acacia dissona</i> var. <i>indoloria</i> | P3 |
| <i>Acacia eremophila</i> var. <i>variabilis</i> | P3 |
| <i>Acacia filifolia</i> | P3 |
| <i>Acacia inophloia</i> | P3 |
| <i>Acacia insolita</i> subsp. <i>efoliolata</i> ms. | P3 |
| <i>Acacia newbeyi</i> | P3 |
| <i>Acacia obesa</i> | P3 |
| <i>Acacia phaeocalyx</i> | P3 |
| <i>Acacia repanda</i> ms | P3 |
| <i>Acacia sedifolia</i> subsp. <i>pulvinata</i> ms..... | P3 |
| <i>Beaufortia</i> sp. Column (Beard 8119)..... | P3 |
| <i>Calytrix nematoclada</i> | P3 |
| <i>Chorizandra multiarticulata</i> | P3 |
| <i>Conospermum eatoniae</i> | P3 |
| <i>Daviesia uncinata</i> ms. | P3 |
| <i>Dryandra horrida</i> | P3 |
| <i>Dryandra subpinnatifida</i> (now <i>D. subpinnatifida</i> var. <i>imberbis</i>)..... | P2 |
| <i>Dryandra viscida</i> ms..... | P3 |
| <i>Eucalyptus exigua</i> | P3 |
| <i>Frankenia drummondii</i> | P3 |
| <i>Gastrolobium stenophyllum</i> | P3 |
| <i>Grevillea insignis</i> subsp. <i>elliottii</i> | P3 |
| <i>Grevillea pilosa</i> subsp. <i>redacta</i> | P3 |
| <i>Grevillea spinosissima</i> | P3 |
| <i>Hakea myrtoides</i> | delete |
| <i>Isoetes brevicula</i> | P3 |
| <i>Jacksonia epiphyllum</i> ms..... | delete |
| <i>Lasiopetalum fitzibbonii</i> | P3 |
| <i>Laxmannia grandiflora</i> subsp. <i>stirlingensis</i> | P3 |
| <i>Melaleuca arenaria</i> | P3 |
| <i>Monotoca leucantha</i> | P3 |
| <i>Persoonia pungens</i> | P3 |
| <i>Persoonia sulcata</i> | P3 |
| <i>Pimelea graniticola</i> | delete |
| <i>Prostanthera nanophylla</i> | P3 |
| <i>Stenanthemum coronatum</i> | P3 |
| <i>Stenanthemum tridentatum</i> | P3 |
| <i>Stylidium neglectum</i> | P3 |
| <i>Tetratheca retrorsa</i> | P3 |
| <i>Thysanotus tenuis</i> | P3 |

| | |
|-----------------------------------|----|
| <i>Verticordia gracilis</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 which are known from several populations, and the taxa are not believed to be under immediate threat
- P4 Priority Four - Rare Taxa
Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors.
- delete species recommended to be taken off the Priority Flora list

3. Priority Flora in the Narrogin District

The conservation status of the priority flora (poorly known or thought to be rare) in the Narrogin District are described in Part Three. A recommended future protection status is provided for each species, based on known information. For most of the priority flora the main research requirement is to continue to survey for populations based on previous collections or interpretation of habitat types to locate new populations. When surveys are proposed it is recommended that conservation reserves in the District be first targeted. Prior to surveying for species, the data base program "Prospect" may be used as a tool to predict where priority 1 and 2 flora may be located on these reserves. Usually Priority Two taxa are in most need of survey because of low numbers of populations and small population sizes. However, the threat from salinity and rising ground water may require that in some cases more common (priority Three) but highly susceptible taxa are targeted for immediate survey.

4. Implementation and term of the Management Program

A recovery will be appointed which will oversee and report annually to CALM's Corporate Executive on the implementation of this Management Program.

This program shall run for a period of ten years, unless subsequent research or changes to the schedule of Declared Rare Flora cause it to be superseded earlier. During this period, the Department of CALM may institute any changes to the provisions outlined in this program as are found, through further research, to be necessary for conservation of the Declared Rare Flora in the District.

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GLOSSARY

| | |
|----------------------|---|
| Abaxial | That surface of any structure which is remote or turned away from the axis. |
| Acicular | Needle-shaped and stiff |
| Acuminate | Tapering gradually to a protracted point. |
| Acute | Terminating in a distinct but not protracted point, the converging edges separated by an angle less than 90 degrees. |
| Adaphic | Pertaining to the soil. |
| Adaxial | Tuned towards the axis. |
| Alluvium | Silt and sand in broad valley flats, extensively reworked by present drainage. Alluvium is laid down by or in water. Older Tertiary age. |
| Alluvium (Qa) | Silt, sand and gravel in stream channels. Alluvium is laid down by or in water. Younger, Quaternary in age. |
| Alternate | Of leaves or other lateral organs, borne singly at different heights on the axis: of floral parts, on different radius, eg describing the position of stamens with respect to petals. |
| Amphibolite | A dark, heavy rock consisting mainly of amphibole and plagioclase but with no quartz. |
| Annual | A plant that grows from a seed, then flowers, fruits and dies in the same season. |
| Anther | The part of the stamen which produces pollen. |
| Apical | At the tip, or terminal. relative to the apex of a structure. |
| Apiculate | Terminating in a short, sharp, flexible point. |
| Appressed | Pressed together without being united. |
| Aril | A fleshy appendage of the seed, growing near the seed stalk. |
| Article | Part of a branch or fruit pod which separates easily from the rest at a joint. |
| Ascending | Growing erect after an oblique or semi-horizontal beginning. |
| Attenuate | Tapering gradually. |
| Auricle | Any ear-like lobed appendage |

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|--|---|
| Awn | A bristle-like appendage, eg on the tip or back of the lemma of a grass floret |
| Axil | The angle between the leaf or branch and the axis from which it springs. |
| Axis | A stem, (commonly used for the main stem of a whole plant or of an inflorescence. |
| Beak | A prominent terminal projection, especially of a carpel or fruit. |
| Bract | A modified leaf in whose axil an inflorescence or a flower arises. |
| Bracteole | A secondary bract at the base of an individual flower. |
| Calyx | The sepals collectively forming the outer whorl of the flower. |
| Calyx tube | A tube formed by fusion or cohesion of sepals. cf. hypanthium . |
| Campanulate | Bell-shaped. |
| Capitulum | A racemose inflorescence with sessile flowers compacted on a flattened and expanded, or rounded apex of a peduncle. |
| Capsule | A dry fruit formed from two or more united carpels and dehiscing at maturity to release the seeds. |
| Carpel | The organ containing the ovules, composed typically of an ovary, a sterile style, and a pollen-receptive stigma. |
| Caudate | Having a narrow tail-like appendage. |
| Cilia | In unicellular plants, gametes, spores, etc, minute hair like protrusions whose movement confers motility on the cell; in higher plants hairs more or less confined to the margins of an organ. sing. cilium ; adj. ciliate . |
| Cilium | A hair like structure, usually one of a marginal series forming a fringe. |
| Clavate | Club shaped. |
| Claw | A narrow, stalk-like basal portion of a petal, sepal or bract. |
| Colluvium and minor alluvium (Qc) | Silt sand and gravel derived from underlying and adjacent laterite and bedrock. Young, Quaternary in age. Colluvium is loose or incoherent deposits, usually at the foot of a slope or cliff, brought there by gravity. |
| Column | Any structure like a column, ie united stamens in orchids |
| Compressed | Flattened in one plane either dorsally (bringing the front and back closer together) or laterally (bringing the sides closer together). |

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| Cone | (Loosely) in Casuarina, a woody multiple fruit incorporating bracts and bracteoles associated with the flowers. |
| Connate | Fused to another organ (or other organs) of the same kind. |
| Convolute | Of the arrangement of the corral lobes in a bud, a form of imbricate aestivation in which each segment has one edge overlapping the adjacent segment, like a furled umbrella. |
| Cordate | Of a leaf blade, broad and notched at the base; heart-shaped. |
| Corolla | The inner whorl of a flower consisting of free or united petals. |
| Corymb | A racemose inflorescence in which the pedicels of the lower flowers are longer than those of the flowers above, bringing all the flowers to about the same level. |
| Cotyledon | The primary leaf (or one of two or more primary leaves) of an embryo. |
| Crenate | With small, rounded teeth; scalloped. |
| Crenulate | Minutely scalloped. |
| Crown | The part of a tree or shrub above the level of the lowest branch. |
| Cuneate | Wedge-shaped. |
| Cuspidate | Tapering into a sharp rigid point. |
| Cyclic | Of floral organs; several borne at the same level on the axis; whorled. cf. spiral . |
| Cyme | 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. |
| Deciduous | Falling seasonally, eg the leaves or bark of some trees. |
| Decumbent | Spreading horizontally but then upwards. |
| Decurrent | Extending downwards beyond the point of insertion, eg of a lamina extending downwards to form a flange along the petiole. |
| Decussate | In pairs, with successive pairs borne at right angles to each other. |
| Dehiscent | Opening when ripe. |
| Dentate | Toothed. |
| Denticulate | Finely toothed. |
| Divaricate | Widely spreading. |

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| Dicotyledon | A flowering plant whose embryo has two (rarely more) cotyledons (seed leaves) cf. monocotyledon . |
| Digitate | Branching from the axis or stalk like fingers of a hand. |
| Dioecious | Having the male and female reproductive structure on separate plants. cf. monoecious . |
| Disc | A plate or rim of tissue, derived from the receptacle of a flower, occurring between whorls of floral parts. |
| Distal | Remote from the point of origin or attachment cf. proximal . |
| Dolerite dyke | Dark, heavy, igneous rock, composed of dolerite, cuts through granite, weathers into red clay and readily forms. duri-crust or ironstone boulders. |
| Dorsiventral | Having structurally different upper and lower surfaces. |
| Drupe | A succulent fruit formed from one carpel, having seed(s) enclosed in a stony layer of the fruit wall. adj. drupaceous (which is often used to mean drupe-like but not strictly a drupe). |
| Elliptic | Oval in outline, widest at the centre. |
| Enation | An epidermal growth. |
| Endemic | Having a natural distribution confined to a particular geographical region. |
| Entire | Having a smooth margin, not dissected or toothed. |
| Entomophilous | Pollinated by insects. |
| Ephemeral | Short-lived. |
| Eremean | Pertaining to regions of low, irregular rainfall. |
| Evergreen | Bearing green leaves throughout the year. |
| Exerted | Protruding, eg stamens with respect to a corolla tube. |
| Falcate | Sickle-shaped. |
| Family | A group of one to many genera believed to be related phylogenetically, usually clearly separable from other such groups. |
| Filament | A thread like structure ; the stalk of an anther, or a stamen. |
| Filiform | Thread-like. |
| Floral | Belonging to or associated with a flower. |

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| Floret | A grass flower, together with the lemma and palea that enclose it (often applies to flowers in Cyperaceae and Asteraceae). |
| Flower | The blossom of a plant, comprising in generally sepals, petals, stamens, and/or pistil, being basically a leafy shoot adapted for reproductive purposes. |
| Follicle | A dry dehiscent fruit consisting of one carpel, opening only along one side, ie <i>Banksia</i> . |
| Forb | A non-woody plant other than a grass, sedge rush, etc cf. herb. |
| Forest | Large area of land predominantly covered by trees with a long trunk and spreading top. |
| Free | Not fused or united (with organs). |
| Fruit | The seed- bearing structure in angiosperms. formed from the ovary after flowering. |
| Genus | 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. genera . |
| Geophyte | A plant whose perennating buds are buried in the soil. |
| Glabrescent | Becoming glabrous. |
| Glabrous | Without hairs. |
| Gland | A structure that secretes oil, nectar or other liquid, embedded in or projecting from plant tissue. |
| Glandular | Bearing glands; functioning as a gland. |
| Glaucous | Blue-green in colour, with a whitish bloom (as in the juvenile leaves of many eucalypts). |
| Granitic | Includes all granite like rocks (eg. adamellite). |
| Habit | The growth form of a plant, comprising its size, shape, texture and orientation. |
| Habitat | The environment in which a plant lives. |
| Halophyte | A plant adapted to living in a highly saline environment; a plant that that accumulates high concentrations of salt in its tissues. |
| Heath | A dense layer of low shrubs less than 2 m tall. |

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| Herb | A seed plant with a green , non - woody stem. Stems. are not persistent above the ground. |
| Herbaceous | Not woody; soft in texture. |
| Hyaline | Translucent, almost clear like glass. |
| Hybrid | An offspring of genetically different plants (in a Flora, usually applied where the parents are of different species). |
| Hypanthium | A floral cup or tube. |
| Imbricate | Of perianth parts, having the edges overlapping in the bud. |
| Incised | Cut deeply, sharply and often irregularly (an intermediate condition between toothed and lobed). |
| Incurved | bent or curved inwards or upwards; of leaf margins curved towards the adaxial surface. |
| Induplicate | Folded inwards so that the outer faces of the margins are in contact. |
| Inflexed | Bent sharply upwards or forwards. |
| Inflorescence | A flowering or putting forth blossoms.; method in which flowers are arranged on an axis; a flowering branch. |
| Internode | The portion of a stem between the level of insertion of two successive leaves or leaf pairs (or branches of an inflorescence). |
| Juvenile | Of leaves, formed on a young plant and different in form from the adult leaves. |
| Keel | 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. |
| Keel petal | A boat shaped structure formed by 2 anterior petals of Leguminosae. |
| Keeled | Of leaves or bracts, folded and ridged along the midrib. |
| Labellum | The lower petal, morphologically posterior in orchids. In orchids it is a modified lower petal often referred to as the lip or tongue. |
| Lake deposits (QI) | Saline and gypsiferous clay and silt in playa lakes. Young, Quaternary in age. |
| Lamina | A thin layer or scale; the blade of a leaf or petal. |
| Lanceolate | Slightly broad, or tapering, at the base tapering to point; lance shaped. |

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| Laterite | Limonite cemented nodular and massive duricrust overlaying deeply weathered bedrock. |
| Leaflet | A small leaf; an individual unit of a compound leaf. |
| Legume | A fruit characteristic of the families Mimosaceae, Caesalpiniaceae and Papilionaceae formed from one carpel and either dehiscent along both sides, or indehiscent. |
| Lepidote | Covered with small, membranous scales. |
| Lignotuber | A woody swelling; often +/- underground at the base, as in Mallee Eucalypts and <i>Banksia</i> 's. |
| Limb | The flattened expanded part of a calyx or corolla, the base of which is tubular. |
| Linear | Or in a line; tape- or thread-like. |
| Lobe | Any rounded projection of an organ |
| Mallee | The growth form of many Eucalypts; a multi stemmed shrub, or A shrubland greater than 1 m tall dominated by multi-stemmed <i>Eucalyptus spp.</i> shrub. |
| Mallet | A small to medium-sized tree with conspicuously dense terminal crown; often more or less in pure stands. |
| Marginal | Occurring at or very close to the margin. |
| Megasporangia | A sac containing large spore produced by <i>Isoetes</i> . |
| Microsporangia | A sac containing small spores produced by <i>Isoetes</i> . |
| Midrib | The central, and usually the most prominent, vein of a leaf or leaf-like organ. |
| Migmatite | Amigmatite; different textures of rock consisting of thin layers of granite and schist. |
| Monocotyledon | A flowering plant whose embryo has only one cotyledon (seed leaf).cf. dicotyledon . |
| Monoecious | Having the male and female reproductive structures in separate flowers but on the same plant. Cf dioecious . |
| Monomorphic | Developing with no or very slight change of form from stage to stage. |
| Morphology | The form and structure of an organism or part of an organism; the study of form and structure. |

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| Mucro | A sharp, abrupt terminal point. Adj. Mucronate . |
| Nerve | A vein. |
| Node | The level (transverse panel) of a stem at which one or more leaves arise. |
| Obconical | Cone-shaped but attached at the narrower end. |
| Obcordate | Of a leaf blade, broad and notched at the tip; heart-shaped but attached at the point end. |
| Oblanceolate | Inversely lanceolate; ie with narrower end towards the point of attachment. |
| Oblique | Of a leaf or a leaflet, larger on one side of the midrib than on the other ie asymmetrical. |
| Oblong | Having the length greater than the width but no many times greater, and the sides parallel. |
| Obtuse | Blunt or rounded at the apex, the converging edges separated by an angle greater than 90 degrees. |
| Obvate | Similar in shape to ovate but attached at the narrower end. |
| Operculum | In eucalypts, the cap of a flower bud that dehisces at maturity exposing the reproductive organs. |
| Opposite | Of leaves, borne at the same level but on different sides of the stem; of floral parts, on the same radius (as). Cf. Alternate |
| Orbicular | circular or nearly so. |
| Ovary | The lowest part of the pistil containing the ovules, on maturing becomes the fruit. |
| Ovate | Egg shaped; egg shaped and attached by the broader end. |
| Ovule | The organ of a seed-plant borne on the placenta that develops into a seed after fertilisation. |
| Panicle | A compound raceme; an indeterminate inflorescence in which the flowers are borne on branches of the main axis or on further branches of these. |
| Paniculate | Indeterminate and much branched. |
| Papilla | A small, elongated protuberance on the surface of an organ, usually an extension of one epidermal cell. Adj. Papillose |
| Pappus | 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. |

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| Partite | Divided, almost to the base, into segments (commonly applied to a style). |
| Pedicle | The stalk of a bud, fruit, or flower. |
| Peduncle | The common stalk of a cluster of flower buds. |
| Penicillate | Pencil-shaped; tufted like an artist's brush. |
| Perennial | Plants living for more than two years, often for a number of years, and usually flowering each year. |
| Perianth | The outer whorl of floral leaves of a flower, when not clearly divided into calyx and corolla; collectively the calyx and corolla. |
| Petal | One of the parts of the corolla, generally coloured. |
| Petiole | The stalk of a leaf. |
| Phyllode | A leaf stalk that is flattened and leaf-like and functions as a leaf. This modification often occurs in Acacias. |
| Pilose | Hairy, the hairs soft and clearly separated but not sparse. |
| Pinnate | Divided into pinnae; once-compound. Cf. Bipinnate |
| Pinnatifid | Cut deeply into lobes that are spaced out along the axis (of the leaf). cf. Plamatifid |
| Pinnatisect | Dissected down to the midrib but having segments confluent with it. |
| Pistil | The female organ of a flower consisting of ovary, style and stigma. |
| Plumose | Like a feather; with fine hairs branching from a central axis. |
| Pod | A leguminous fruit. |
| Pollination | The transfer of pollen from the male organ, where it is formed, to the receptive region of a female organ, eg from anther to stigma. |
| Procumbent | Trailing or spreading along the ground but not rooting at the nodes. |
| Propagule | A structure with the capacity to give rise to a new plant, eg a seed, a spore, part of the vegetative body capable of independent growth if detached from the parent. |
| Prophyll | A bracteole or small bract just below the calyx of a flower. |
| Prostrate | Trailing along the ground or lying closely to the ground. |
| Puberulose | Covered with minute, soft, erect hairs. |

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| Pubescent | Covered with short, soft, erect hairs. |
| Pulvinus | A swelling at the base of the stalk of a leaf or leaflet, often glandular or responsive to touch. |
| Punctate | Marked with dots. |
| Pungent | Ending in a stiff, sharp point; having an acrid taste or smell. |
| Raceme | The inflorescence having a common axis and stalked flowers in which the main axis continues to grow. The terminal flower is therefore the last to develop. |
| Rachis | The axis of an inflorescence or a pinnate leaf; pl. rachises. secondary rachis: the axis of a pinna in a bipinnate leaf. |
| Receptacle | The axis of a flower(= torus); in ferns, an axis on which sporangia arise. |
| Recurved | Curved or curled downwards or backwards. |
| Reflexed | Bent sharply downwards or backwards. |
| Reticulate | Forming a network. |
| Retrorse | Directed backwards or downwards. cf. antrorse . |
| Revolute | Rolled downwards or backwards. |
| Reworked sandplain | Yellow and white sand containing locally abundant limonite pebbles. |
| Rhizome | an underground creeping stem which grows more or less horizontally. |
| Samphires | Saltbush or Bluebushes are mostly herbs or shrubs, usually with small fleshy leaves or green succulent jointed stems. Particularly common in saline habitats where they may be the only family present. |
| Scabrid(= scabrous) | Rough to the touch. |
| Scale | A flat plate-like external structure. |
| Scape | The flowering stalk. |
| Scarious | Dry and membranous. |
| Sclerophyllous | With leaves stiffened by sclerenchyma. |
| Scrub | A sparse layer of shrubs of varying height. |
| Sepal | A member of the outer whorl of non-fertile parts surrounding the fertile organs of the flower. |

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| Seriate | In rows or whorls. |
| Serrate | Toothed, with asymmetrical teeth pointing forward. |
| Sessile | Without a stalk. Sitting directly on the base without support, stalk, pedicle, or peduncle. |
| Seta | A bristle or stiff hair. |
| Sheathing | A stalk or leaf blade more or less encircling the stem. |
| Shrub | A woody perennial, less than 5 m high and with a bushy appearance, which usually has several stems. at or near the ground. |
| Siliceous | Containing silica. |
| Silicula | A short siliqua, not more than twice as long as its width. |
| Simple | Undivided; of a leaf, not divided into leaflets; of a hair or an inflorescence, not branched. |
| Sinuate | With deep, wave-like depressions along the margins. cf. undulate . |
| Solitary | Of flowers, borne singularly, not grouped in an inflorescence. |
| Spathulate | Spoon shaped; broad at the tip and narrow toward the base. |
| Species | A taxon comprising individuals, or populations of individuals, capable of interbreeding to produce fertile offspring; the largest group of individuals which there are no distinguishable, consistent differences in form or reproductive mechanisms. |
| Spike | An unbranched, indeterminate inflorescence in which the flowers are without stalks. adj. spicate . |
| Spikelet | A unit of the inflorescence in grasses, sedges and some other monocotyledons, consisting of one to many flowers and associated glumes. |
| Spine | A stiff, sharp pointed structure, formed by modification of a plant organ, eg a lateral branch or a stipule. |
| Spinescent | Ending in a spine; modified to form a spine. |
| Spinose | Bearing spines. |
| Spiral | Of leaves or floral organs, borne at different levels on the axis, in an ascending spiral. cf. cyclic . |
| Sporangium | A sac containing spores as in a fern. |

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| Stamen | One of the male reproductive organs of a flower consisting of stalk or filament with anther containing pollen. |
| Staminode | A sterile stamen, or a structure resembling a stamen and borne on the staminal part of the flower. |
| Standard | The posterior petal in the flower in Papilionaceae. |
| Stellate | Star- shaped; consisting of star-shaped cells. |
| Stem | 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. |
| Stipule | One of a pair of tiny appendages which may be present at the base of a petiole. |
| Stolon | A prostrate or trailing stem that produces roots at the nodes. |
| Stomata | A small aperture or pore in a leaf. |
| Striate | Striped with parallel longitudinal lines or ridges. |
| Strophoile | A small hard appendage outside the testa of a seed. |
| Style | A stalk joining the stigma to the ovary of the pistil. |
| Subulate | Narrow and tapering gradually to a fine point. |
| Succulent | Juicy or fleshy. |
| Sulcate | Grooved; furrowed. |
| Taxon | A group or category, at any level, in a system for classifying plants or animals. |
| Terete | Cylindrical or nearly so; circular in cross-section. |
| Terminal | At the apex or distal end. |
| Ternate | In groups of three; of leaves, arranged in whorls of three; of a single leaf, having the leaflets arranged in groups of three. |
| Terrestrial | Of or on the ground; of the habitat of a plant, on land as opposed to in water, or on the ground as opposed to on another plant. |
| Throat | The place on the corolla where the limb joins the tube. |
| Tomentum | Covering of dense, matted, woolly hairs. adj. tomentose . |
| Torus | See Receptacle . |

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| Tree | A woody plant with a single trunk bearing lateral branches. |
| Trifoliolate | Having three leaves. |
| Truncate | With an abruptly transverse end, as if cut off. |
| Tuber | An storage organ formed by swelling of an underground stem or the distal end of a root. |
| Tubercle | A small wart-like outgrowth. |
| Tuberculate | Covered with tubercles. |
| Tuberous | Swollen; of roots, tuber like. |
| Umbel | 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. |
| Undulate | Wavy, ie not flat. cf. sinuate . |
| Uniseriate | Having only one row of serrations on the edge. |
| Unisexual | Bearing only male or female reproductive organs. |
| United | Fused together. |
| Urceolate | Urn-shaped. |
| Valve | One of the pieces formed by the vertical splitting of capsular fruits to allow the seed to escape. |
| Vein | A strand of vascular tissue. |
| Venation | The arrangement of veins in a leaf. |
| Verticillate | Arranged in one or more whorls. |
| Vesicle | A bladder- like sac or cavity filled with gas or liquid. |
| Vestigial | reduced from the ancestral condition and no longer functional. cf. rudimentary . |
| Villous | Shaggy with long, weak hairs. |
| Viscid | Of a surface, sticky; coated with a thick, syrupy secretion. |
| Whorl | A set of leaves, flowers, stems., etc. coming from the same node and arranged in a circle around the axis. |
| Wind and alluvial deposits (Qd) | Silt and sand in sheets and dunes, gypsiferous near playa lakes. Young, Quaternary in age. |

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| Wing | 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. |
| Woodland | Large area of land dominated by trees with an open crown and whose trunk is not greater length than the depth of the crown. |
| Xerophyte | A drought-tolerant plant. |