

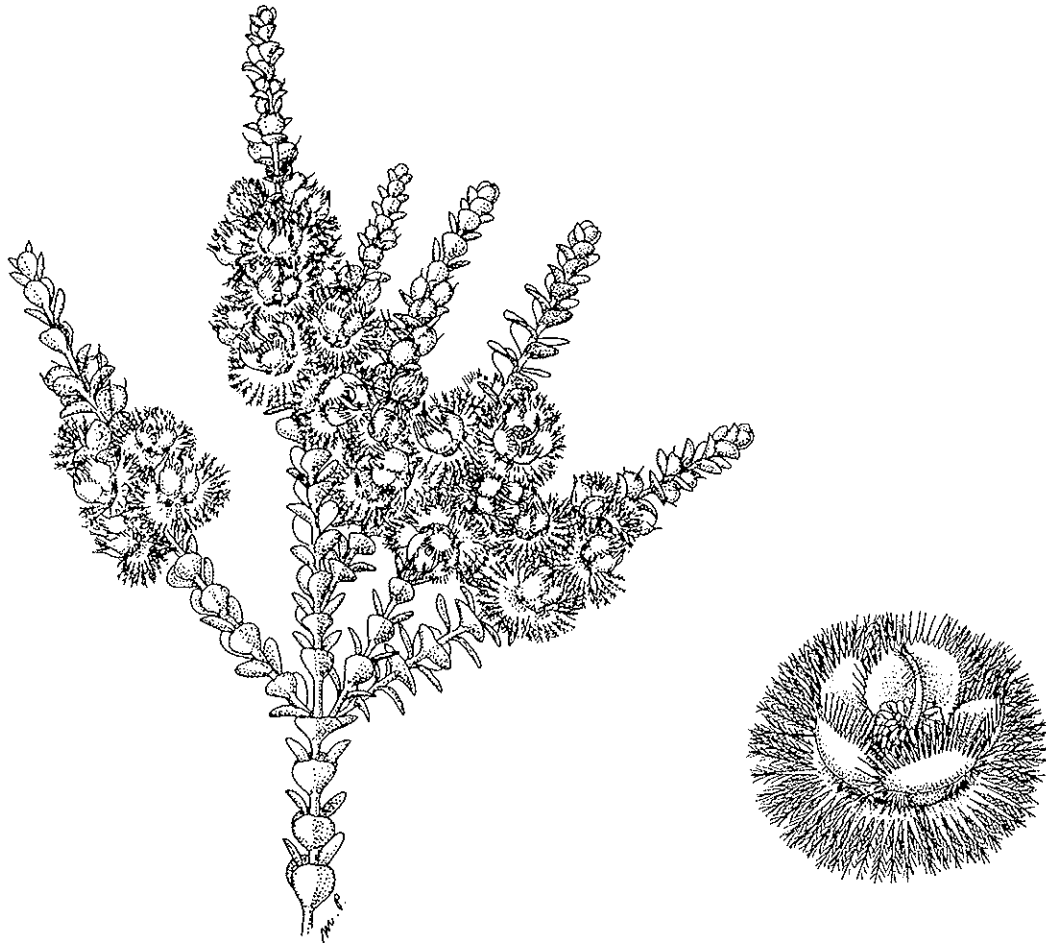
28



# Declared Rare and Poorly Known Flora in the Moora District

by Susan J Patrick and Andrew P Brown

OFFICE OF  
MANAGEMENT OF THE STATE HERBARIUM  
AGRICULTURAL RESEARCH  
AND EXTENSION SERVICE  
MURDOCH UNIVERSITY  
MURDOCH UNIVERSITY  
MURDOCH UNIVERSITY



2001

## Wildlife Management Program No 28



DEPARTMENT OF  
**Conservation**  
AND LAND MANAGEMENT  
*Conserving the nature of WA*

WESTERN AUSTRALIAN WILDLIFE MANAGEMENT PROGRAM NO. 28

THE LIBRARY  
DEPARTMENT OF CONSERVATION  
& LAND MANAGEMENT  
WESTERN AUSTRALIA

# Declared Rare and Poorly Known Flora in the Moora District

by

Susan J. Patrick  
Andrew P. Brown

Illustrations  
by

Felicity Behan  
Amanda Lin  
Susan Patrick  
Margaret Pieroni  
John Rainbird  
Donna (Terrington) Jones  
Greg Keighery

2001

Published by the

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

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

©Department of Conservation and Land Management  
Western Australia 2001

ISSN 0816-9713

Cover illustration:

*Verticordia albida* A.S. George  
by

Margaret Pieroni

Editors ..... Angie Walker and Jill Pryde  
Page preparation ..... Angie Walker  
Maps ..... CALM Information Management Branch

## FOREWORD

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

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

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

This Program has been approved by the Executive Director, Department of Conservation and Land Management, the 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 the Plan was accurate at August 1994.

## TABLE OF CONTENTS

	Page		Page
Foreword .....	iii	<i>Eucalyptus impensa</i> .....	76
Acknowledgements .....	viii	<i>Eucalyptus johnsoniana</i> .....	78
Abbreviations .....	ix	<i>Eucalyptus lateritica</i> .....	81
<b>PART ONE: INTRODUCTION</b> .....	<b>1</b>	<i>Eucalyptus leprophloia</i> .....	83
1. The Need for Management .....	1	<i>Eucalyptus pruiniramis</i> .....	85
2. Objective of the Program .....	1	<i>Eucalyptus rhodantha</i> var. <i>petiolaris</i> .....	87
3. Rare Flora Legislation and Guidelines for Gazettal .....	3	<i>Eucalyptus rhodantha</i> var. <i>rhodantha</i> .....	89
4. CALM's Priority Flora List .....	5	<i>Eucalyptus suberea</i> .....	92
5. Responsibilities within the Department .....	6	<i>Gastrolobium appressum</i> .....	94
6. The Moora District .....	6	<i>Gastrolobium hamulosum</i> .....	97
6.1 Climate .....	7	<i>Grevillea batrachioides</i> .....	99
6.2 Geology, Landforms and Soils .....	7	<i>Grevillea calliantha</i> .....	101
6.3 Vegetation .....	8	<i>Grevillea christineae</i> .....	103
7. Botanical History of the Moora District .....	9	<i>Grevillea pythara</i> .....	105
<b>PART TWO: DECLARED RARE FLORA IN THE MOORA DISTRICT</b> .....	<b>11</b>	<i>Hakea megalosperma</i> .....	107
<b>A. Extant Taxa</b> .....	<b>12</b>	<i>Hemiandra gardneri</i> .....	110
<i>Acacia forrestiana</i> .....	12	<i>Hemiandra</i> sp. Watheroo (S.Hancocks 4) .....	113
<i>Acacia vassalii</i> .....	15	<i>Hensmania chapmanii</i> .....	116
<i>Acacia</i> sp. Dandaragan (S.van Leeuwen 269) .....	18	<i>Leucopogon obtectus</i> .....	118
<i>Anigozanthos humilis</i> subsp. <i>chrysanthus</i> .....	21	<i>Paracaleana dixonii</i> ms .....	121
<i>Anigozanthos viridis</i> subsp. <i>terraspectans</i> .....	24	<i>Ptychosema pusillum</i> .....	123
<i>Asterolasia drummondii</i> .....	27	<i>Restio chaunocoleus</i> .....	125
<i>Banksia tricuspis</i> .....	30	<i>Spirogardnera rubescens</i> .....	128
<i>Calectasia arnoldii</i> ms .....	34	<i>Stawellia dimorphantha</i> .....	131
<i>Chamelaucium griffinii</i> ms .....	36	<i>Stylidium scabridum</i> .....	133
<i>Conostylis micrantha</i> .....	38	<i>Thelymitra stellata</i> .....	135
<i>Darwinia acerosa</i> .....	40	<i>Verticordia albida</i> .....	137
<i>Darwinia carnea</i> .....	42	<i>Wurmbea tubulosa</i> .....	139
<i>Daviesia bursarioides</i> .....	44	<b>B. Presumed Extinct Taxa</b> .....	<b>142</b>
<i>Daviesia speciosa</i> .....	47	<i>Calothamnus accedens</i> .....	142
<i>Drakaea elastica</i> .....	49	<i>Lasiopetalum rotundifolium</i> .....	144
<i>Drakonorchis drakeoides</i> ms .....	51	<i>Leucopogon marginatus</i> .....	146
<i>Dryandra mimica</i> .....	54	<i>Menkea draboides</i> .....	148
<i>Dryandra serratuloides</i> subsp. <i>perissa</i> .....	56	<i>Platysace dissecta</i> .....	150
<i>Dryandra serratuloides</i> subsp. <i>serratuloides</i> .....	58	<b>PART THREE: PRIORITY FLORA IN THE MOORA DISTRICT</b> .....	<b>152</b>
<i>Eremophila microtheca</i> .....	60	<b>A. Priority One Taxa</b> .....	<b>153</b>
<i>Eremophila nivea</i> .....	62	<i>Acacia carens</i> .....	153
<i>Eucalyptus absita</i> .....	65	<i>Acacia chapmanii</i> subsp. <i>australis</i> ms .....	155
<i>Eucalyptus argutifolia</i> .....	68	<i>Acacia cochlocarpa</i> subsp. <i>cochlocarpa</i> ms .....	157
<i>Eucalyptus balanites</i> .....	70	<i>Acacia congesta</i> subsp. <i>cliftoniana</i> ms .....	159
<i>Eucalyptus crispata</i> .....	72	<i>Acacia flabellifolia</i> .....	161
<i>Eucalyptus dolorosa</i> .....	74	<i>Acacia lanceolata</i> ms .....	163
		<i>Acacia nodiflora</i> .....	165
		<i>Acacia vittata</i> ms .....	167
		<i>Andersonia longifolia</i> .....	169
		<i>Arnocrinum gracillimum</i> .....	171
		<i>Chorizema humile</i> .....	173
		<i>Conospermum densiflorum</i> subsp. <i>unicephalatum</i> .....	175

<i>Conospermum scaposum</i> .....	177
<i>Conostylis dielsii</i> subsp. <i>teres</i> .....	179
<i>Dampiera tephrea</i> .....	181
<i>Darwinia chapmaniana</i> ms .....	183
<i>Darwinia</i> sp. Carnamah (J.Coleby-Williams 148) .....	185
<i>Daviesia pteroclada</i> .....	187
<i>Diuris tinkeri</i> ms .....	189
<i>Drosera marchantii</i> subsp. <i>prophylla</i> .....	191
<i>Dryandra borealis</i> subsp. <i>elatior</i> .....	193
<i>Dryandra fraseri</i> var. <i>oxycedra</i> .....	195
<i>Dryandra kippistiana</i> var. <i>paenepeccata</i> .....	197
<i>Dryandra stricta</i> .....	199
<i>Dryandra trifontinalis</i> .....	202
<i>Eucalyptus absita</i> x <i>loxophleba</i> .....	204
<i>Eucalyptus annuliformis</i> .....	206
<i>Eucalyptus macrocarpa</i> x <i>pyriformis</i> .....	208
<i>Eucalyptus subangusta</i> subsp. <i>virescens</i> .....	210
<i>Eucalyptus</i> sp. Lesueur (E.A.Griffin 2481)....	212
<i>Gastrolobium rotundifolium</i> .....	214
<i>Gompholobium</i> sp. Gairdner Range (E.A.Griffin 2306).....	216
<i>Goodenia arthrotricha</i> .....	218
<i>Goodenia xanthotricha</i> .....	220
<i>Grevillea althoferorum</i> .....	222
<i>Grevillea curviloba</i> .....	224
<i>Grevillea delta</i> .....	226
<i>Grevillea humifusa</i> .....	228
<i>Grevillea murex</i> .....	230
<i>Grevillea pinifolia</i> .....	232
<i>Grevillea tenuiloba</i> .....	234
<i>Grevillea thyrsoides</i> subsp. <i>pustulata</i> .....	236
<i>Haloragis foliosa</i> .....	238
<i>Halosarcia koobabbiensis</i> ms .....	240
<i>Homalocalyx chapmanii</i> .....	242
<i>Hydrocotyle coorowensis</i> ms .....	244
<i>Hypocalymma tenuatum</i> ms .....	246
<i>Jacksonia pungens</i> ms.....	248
<i>Jacksonia</i> sp. Badgingarra (H.Demarz D6601) [sp. 14] .....	250
<i>Lasiopetalum ogilvieanum</i> .....	252
<i>Lasiopetalum</i> sp. Hill River (T.N.Stoate s.n.) .....	254
<i>Lechenaultia juncea</i> .....	256
<i>Leucopogon plumuliflorus</i> .....	258
<i>Macarthuria</i> sp. Mullering (B.J.Keighery 517).....	260
<i>Malleostemon</i> sp. Cooljarloo (B.Backhouse s.n. 16.11.88) .....	262
<i>Myriocephalus suffruticosus</i> .....	264
<i>Phlebocarya pilosissima</i> subsp. <i>teretifolia</i> ....	266
<i>Pityrodia viscida</i> .....	268
<i>Ptilotus caespitosus</i> .....	270
<i>Restio stenandra</i> ms .....	272
<i>Rumex drummondii</i> .....	274
<i>Scaevola eneabba</i> .....	276
<i>Schoenus andrewsii</i> .....	278
<i>Stylidium drummondianum</i> .....	280

<i>Stylidium pseudocaespitosum</i> .....	282
<i>Synaphea quartzitica</i> .....	283
<i>Tetratea remota</i> .....	285
<i>Thomasia formosa</i> .....	287
<i>Thomasia tenuivestita</i> .....	289
<i>Thomasia</i> sp. New Norcia (Cayser s.n. Nov. 1918) .....	291
<i>Thomasia</i> sp. Green Hill (S.Paust 1322).....	293
<i>Thysanotus vernalis</i> .....	295
<i>Verticordia argentea</i> .....	297
<i>Verticordia bifimbriata</i> .....	299
<i>Verticordia comosa</i> .....	301
<i>Verticordia dasystylis</i> subsp. <i>oestopoa</i> .....	303
<i>Verticordia fragrans</i> .....	305
<i>Verticordia luteola</i> var. <i>rosea</i> .....	307
<i>Verticordia spicata</i> subsp. <i>squamosa</i> .....	309
<b>B. Priority Two Taxa</b> .....	312
<i>Acacia anarthros</i> .....	312
<i>Acacia aristulata</i> ms .....	314
<i>Acacia browniana</i> var. <i>glaucescens</i> .....	316
<i>Acacia chapmanii</i> subsp. <i>chapmanii</i> ms.....	318
<i>Acacia dura</i> .....	320
<i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i> Cockleshell Gully variant (E.A.Griffin 2039) .....	322
<i>Acacia plicata</i> .....	324
<i>Acacia recurvata</i> ms .....	326
<i>Acacia retrorsa</i> .....	328
<i>Acacia telmica</i> .....	330
<i>Acacia wilsonii</i> ms .....	332
<i>Andersonia gracilis</i> .....	334
<i>Anigozanthos humilis</i> subsp. <i>grandis</i> ms .....	336
<i>Arnocrinum drummondii</i> .....	338
<i>Astroloma</i> sp. Eneabba (N.Marchant s.n.) .....	340
<i>Boronia ericifolia</i> .....	342
<i>Calandrinia dielsii</i> .....	344
<i>Calytrix chrysantha</i> .....	346
<i>Calytrix drummondii</i> .....	348
<i>Calytrix eneabbensis</i> .....	350
<i>Calytrix platycheiridia</i> .....	352
<i>Calytrix superba</i> .....	354
<i>Caustis gigas</i> ms .....	356
<i>Comesperma rhadinocarpum</i> .....	358
<i>Crassula helmsii</i> .....	360
<i>Daviesia debilior</i> subsp. <i>debilior</i> .....	362
<i>Daviesia dielsii</i> .....	364
<i>Dryandra platycarpa</i> .....	366
<i>Epitriche demissus</i> .....	368
<i>Eucalyptus abdita</i> .....	370
<i>Eucalyptus angularis</i> .....	372
<i>Eucalyptus diminuta</i> ms.....	375
<i>Gompholobium</i> sp. Marchagee (B.R.Maslin 1427) .....	376
<i>Goodenia trichophylla</i> .....	378
<i>Grevillea bififormis</i> subsp. <i>cymbiformis</i> .....	380
<i>Grevillea bracteosa</i> .....	382

<i>Grevillea makinsonii</i> .....	384	<i>Comesperma acerosum</i> .....	484
<i>Grevillea synapheae</i> subsp. <i>pachyphylla</i>		<i>Conospermum eatoniae</i> .....	486
Minyolo variant (S.Patrick & A.P.Brown		<i>Conostephium minus</i> .....	488
SP 1139) .....	386	<i>Cryptandra nudiflora</i> .....	490
<i>Grevillea synapheae</i> subsp. <i>synapheae</i>		<i>Daviesia epiphyllum</i> .....	492
Mt Misery variant (S.D.Hopper 6333) .....	388	<i>Desmocladius elongatus</i> ms .....	494
<i>Hakea longiflora</i> .....	390	<i>Desmocladius gigas</i> ms .....	496
<i>Hemigenia curvifolia</i> .....	392	<i>Dryandra echinata</i> .....	498
<i>Hensmania stoniella</i> .....	394	<i>Dryandra pteridifolia</i> subsp. <i>vernalis</i> .....	500
<i>Hypocalymma serratum</i> ms .....	396	<i>Dryandra speciosa</i> subsp. <i>macrocarpa</i> .....	502
<i>Hypocalymma tetrapterum</i> .....	398	<i>Dryandra tortifolia</i> .....	504
<i>Hypocalymma xanthopetalum</i>		<i>Eucalyptus foecunda</i> subsp. <i>Coolimba</i>	
var. <i>linearifolium</i> ms .....	400	(M.I.H.Brooker 9556) .....	506
<i>Hypocalymma</i> sp. <i>Cataby</i>		<i>Grevillea asparagoides</i> .....	508
(G.J.Keighery 5151) .....	402	<i>Grevillea leptopoda</i> .....	510
<i>Lasiopetalum</i> sp. <i>Coorow</i> (E.Ried 101) .....	404	<i>Grevillea spinosissima</i> .....	512
<i>Leucopogon glaucifolius</i> .....	406	<i>Grevillea thyrsoides</i> subsp. <i>thyrsoides</i> .....	514
<i>Lysinema elegans</i> .....	408	<i>Grevillea uncinulata</i> subsp. <i>florida</i> .....	516
<i>Macarthuria apetala</i> .....	410	<i>Grevillea uniformis</i> .....	519
<i>Mesomelaena stygia</i> subsp. <i>deflexa</i> .....	412	<i>Guichenotia alba</i> .....	521
<i>Monotoca leucantha</i> .....	414	<i>Haemodorum loratum</i> .....	523
<i>Nemcia axillaris</i> .....	416	<i>Hakea myrtoides</i> .....	525
<i>Patersonia spirifolia</i> .....	419	<i>Hakea spathulata</i> .....	527
<i>Persoonia chapmaniana</i> .....	421	<i>Hemigenia pimelifolia</i> .....	529
<i>Persoonia filiformis</i> .....	423	<i>Isopogon drummondii</i> .....	530
<i>Podotrochea uniseta</i> .....	425	<i>Isopogon tridens</i> .....	532
<i>Schoenus</i> sp. <i>Warradarge</i>		<i>Jacksonia anihoclada</i> ms .....	534
(E.A.Griffin 3842) .....	427	<i>Jacksonia carduacea</i> .....	536
<i>Schoenus</i> sp. <i>Wongan</i> (E.A.Griffin 3841) .....	429	<i>Kunzea incognita</i> ms .....	538
<i>Stenanthemum grandiflorum</i> ms .....	431	<i>Lasiopetalum lineare</i> .....	540
<i>Stenanthemum limitatum</i> .....	434	<i>Lepidobolus densus</i> ms .....	542
<i>Stylidium aeonioides</i> .....	436	<i>Lepidobolus quadratus</i> ms .....	544
<i>Stylidium diuroides</i> subsp. <i>paucifoliatum</i> .....	438	<i>Leucopogon oliganthus</i> .....	546
<i>Stylidium nonscandens</i> .....	440	<i>Melaleuca sclerophylla</i> .....	548
<i>Thysanotus</i> sp. <i>Badgingarra</i>		<i>Myriocephalus appendiculatus</i> .....	550
(E.A.Griffin 2511) .....	442	<i>Nemcia acuta</i> .....	552
<i>Tricoryne robusta</i> ms .....	444	<i>Olax scalariformis</i> .....	554
<i>Triglochin stowardii</i> .....	446	<i>Patersonia argyria</i> .....	556
<i>Trymalium urceolare</i> .....	448	<i>Persoonia pungens</i> .....	558
<i>Verticordia blepharophylla</i> .....	450	<i>Persoonia rudis</i> .....	560
<b>C. Priority Three Taxa</b> .....	452	<i>Petrophile biternata</i> .....	562
<i>Acacia aprica</i> ms .....	452	<i>Petrophile plumosa</i> .....	564
<i>Acacia cummingiana</i> .....	454	<i>Phlebocarya pilosissima</i>	
<i>Acacia epacantha</i> .....	456	subsp. <i>pilosissima</i> .....	566
<i>Acacia inophloia</i> .....	458	<i>Rinzia crassifolia</i> .....	568
<i>Acacia isoneura</i> subsp. <i>isoneura</i> ms .....	460	<i>Scaevola globosa</i> .....	570
<i>Acacia isoneura</i> subsp. <i>nimia</i> ms .....	462	<i>Schoenus benthamii</i> .....	572
<i>Acacia ridleyana</i> .....	464	<i>Stenanthemum reissekii</i> .....	574
<i>Allocasuarina grevilleoides</i> .....	466	<i>Thysanotus anceps</i> .....	576
<i>Allocasuarina ramosissima</i> .....	468	<i>Verticordia amphigia</i> .....	578
<i>Banksia micrantha</i> .....	470	<i>Verticordia densiflora</i> var. <i>roseostella</i> .....	580
<i>Banksia scabrella</i> .....	472	<i>Verticordia huegelii</i> var. <i>decumbens</i> .....	582
<i>Beaufortia bicolor</i> .....	474	<i>Verticordia insignis</i> subsp. <i>eomagis</i> .....	584
<i>Beaufortia eriocephala</i> .....	476	<i>Verticordia luteola</i> var. <i>luteola</i> .....	586
<i>Calothamnus brevifolius</i> .....	478	<i>Verticordia muelleriana</i>	
<i>Catocolea enodis</i> ms .....	480	subsp. <i>muelleriana</i> .....	588
<i>Chamelaucium conostigmum</i> ms .....	482	<i>Verticordia rutilastra</i> .....	590
		<i>Walteranthus erectus</i> .....	592

**PART FOUR: THE PLAN FOR  
MANAGEMENT ..... 594**

- 1. Determining Priorities ..... 594
- 2. Management and Research Actions ..... 594
  - (i) Fungal Disease ..... 595
  - (ii) Survey ..... 595
  - (iii) Population Size and Few Populations ..... 595
  - (iv) Transport Corridors ..... 596
  - (v) Short-lived Disturbance Opportunists ..... 596
  - (vi) Land Acquisition ..... 596
  - (vii) Fencing ..... 597
  - (viii) Mining ..... 597
  - (ix) Recreation ..... 598
  - (x) Habitat Degradation ..... 598
  - (xi) Ex situ Germ Plasm Collections ..... 598
  - (xii) Re-introduction ..... 598
  - (xiii) Liaison ..... 599
  - (xiv) Monitoring ..... 599
  - (xv) Research ..... 599
  - (xvi) Linear Marking ..... 600
  - (xvii) Environmental Weeds ..... 601
  - (xviii) Fire Regimes ..... 601
- 3. Priority Flora in the Moora District ..... 601
- 4. Implementation and Term of the Management Program ..... 601

**REFERENCES ..... 617**

**GLOSSARY .....629**

**TABLES**

- 1. Moora District Declared Rare Flora scored (1-3) according to the degree of threat or urgency for management and research action .....602
- 2. Moora District Declared Rare Flora ranked in priority order for management and research action .....604
- 3. Priority One, Two and Three species lists with recommended status indicated .....605
- 4. Changes in conservation status .....610
- 5. Declared Rare and Poorly Known Flora in the Moora District. Conservation Status updated to December 1999 .....611
- 6. Taxa in the Moora District added to the CALM Priority Flora List updated to December 1999 .....615

**FIGURES**

- 1. Location of the Moora District in relation to other CALM Management Regions of the State .....2
- 2. The Moora District covered by this Program .....4



## ACKNOWLEDGEMENTS

Work on this document has taken place over several years and a large number of people have provided advice and assistance during that time.

Ray Cranfield and Phil Spencer of the Western Australian Herbarium, CALM carried out numerous field surveys, mainly during 1991-1992. Consultant Ted Griffin provided much population information and valuable discussion.

At the Western Australian Herbarium, identification, taxonomic advice and other information was provided by Anne Cochrane, Richard Cowan, Anne Kelly, Brendan Lepschi, Neville Marchant, Terry Macfarlane, Bruce Maslin, Diana Papenfus, Barbara Rye and Paul Wilson. David Coates also gave much advice on the Program and Angie Walker edited the document with advice from Vicki Hamley.

CALM Moora District staff, Matt Warnock, Ken Borland and David Rose, also provided much help and information for the fieldwork.

Greg Keighery and Bronwyn Keighery were most helpful with discussion and information on many taxa.

Alex George, Elizabeth George and Margaret Pieroni provided much information, particularly for species of *Verticordia* and *Dryandra*.

Other specialist advice was given by the following: Jeni Alford (*Tetratheca*), Eleanor Bennett (*Conospermum*, Sterculiaceae), Jenny Chappill (*Jacksonia*), Bob Chinnock (*Eremophila*), Barry Conn (*Hemiandra*), Mike Crisp (*Daviesia*), Steve Hopper (*Eucalyptus*), Christina Lemsom (*Andersonia*), Allen Lowrie (*Drosera*, *Stylidium*), Bob Makinson, Peter Olde (*Grevillea*), Kelly Shepherd, Carol Wilkins (Sterculiaceae) and Annette Wilson (*Astroloma*).

In the field, many people have been very helpful. Alison and John Doley, Bob Scott and Don Williams provided access to their land and showed us populations of species that occurred there. Charles Straughan of the Three Springs Shire and Alan Tinker showed us new populations that they had found. Guy Richmond provided new information on populations of *Eremophila*. Ray Hart (Hart, Simpson and Associates) also provided information.

## ABBREVIATIONS

Ca	Carnamah Shire
Ch	Chittering Shire
Co	Coorow Shire
D	Dandaragan Shire
Da	Dallwallinu Shire
est.	Estimated number of plants
G	Gingin Shire
I	Irwin Shire
KP	Kings Park Herbarium
Mi	Minginew Shire
Mo	Moora Shire
MRWA	Main Roads W.A.
TS	Three Springs Shire
VCL	Vacant Crown land
VP	Victoria Plains Shire
WATSCU	Western Australian Threatened Species and Communities Unit
WH	as stated on WAHERB
*	WAHERB record only, population not seen more recently

# 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, varieties and phrase-names) (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) Priority Flora 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 threaten 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 (i.e. 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 Moora District, as at 12 August 1994. In 1994, 274 extant taxa were listed as Declared Rare Flora and a further 39 taxa were listed on the Schedule as Presumed Extinct. In addition to those that were declared rare, 1 582 taxa were listed on CALM's Priority Flora List as at February 1994. 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.

The Moora District covers some 25 000 km<sup>2</sup> of which much has been cleared for agriculture, particularly on the eastern side. Figure 1 shows the location of the Moora District in relation to the CALM management regions of the State.

## 2. Objective of the Program

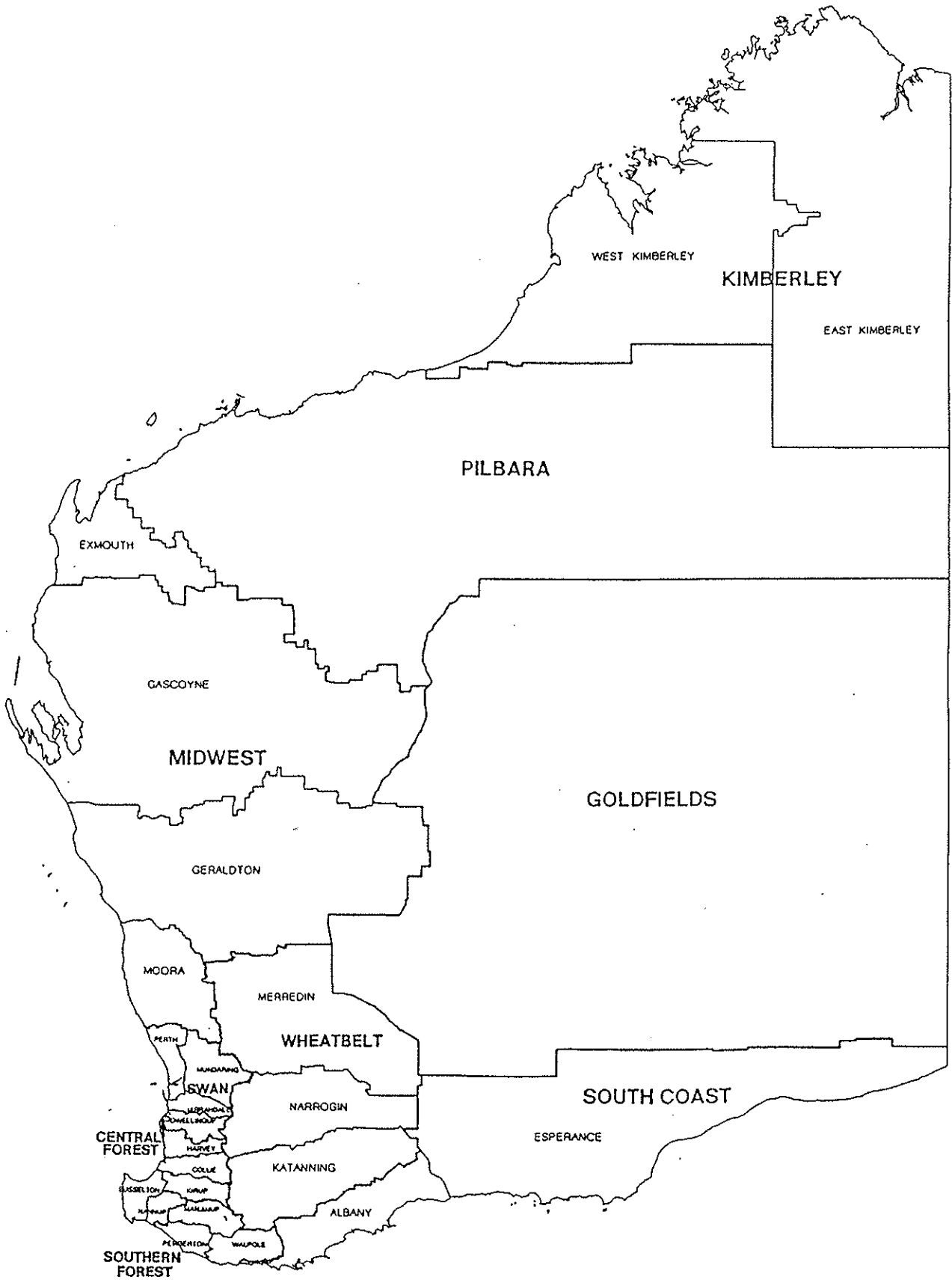
The objective of this program for the Moora District is:

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 of other taxa that are poorly known and may be at risk;
- directing Departmental resources within the Region to those species most urgently in need of attention;

**Figure 1.** Location of the Moora District in relation to other CALM Management Regions of the State



- assisting in the identification of Declared Rare species and other species potentially at risk, and their likely habitats; and
- fostering an appreciation and increased awareness of the importance of protecting and conserving Declared Rare Flora and other species potentially at risk or in need of special protection.

### 3. Rare Flora Legislation and Guidelines for Gazettal

The *Wildlife Conservation Act 1950* 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 threatened and in need of special protection - the taxon is not presently in danger of extinction but is at risk over a longer period through continued depletion, or occurs largely on sites likely to experience changes in land use which could threaten its survival in the wild;
- or
- Presumed Extinct - taxa which have not been collected, or otherwise verified over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently.

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

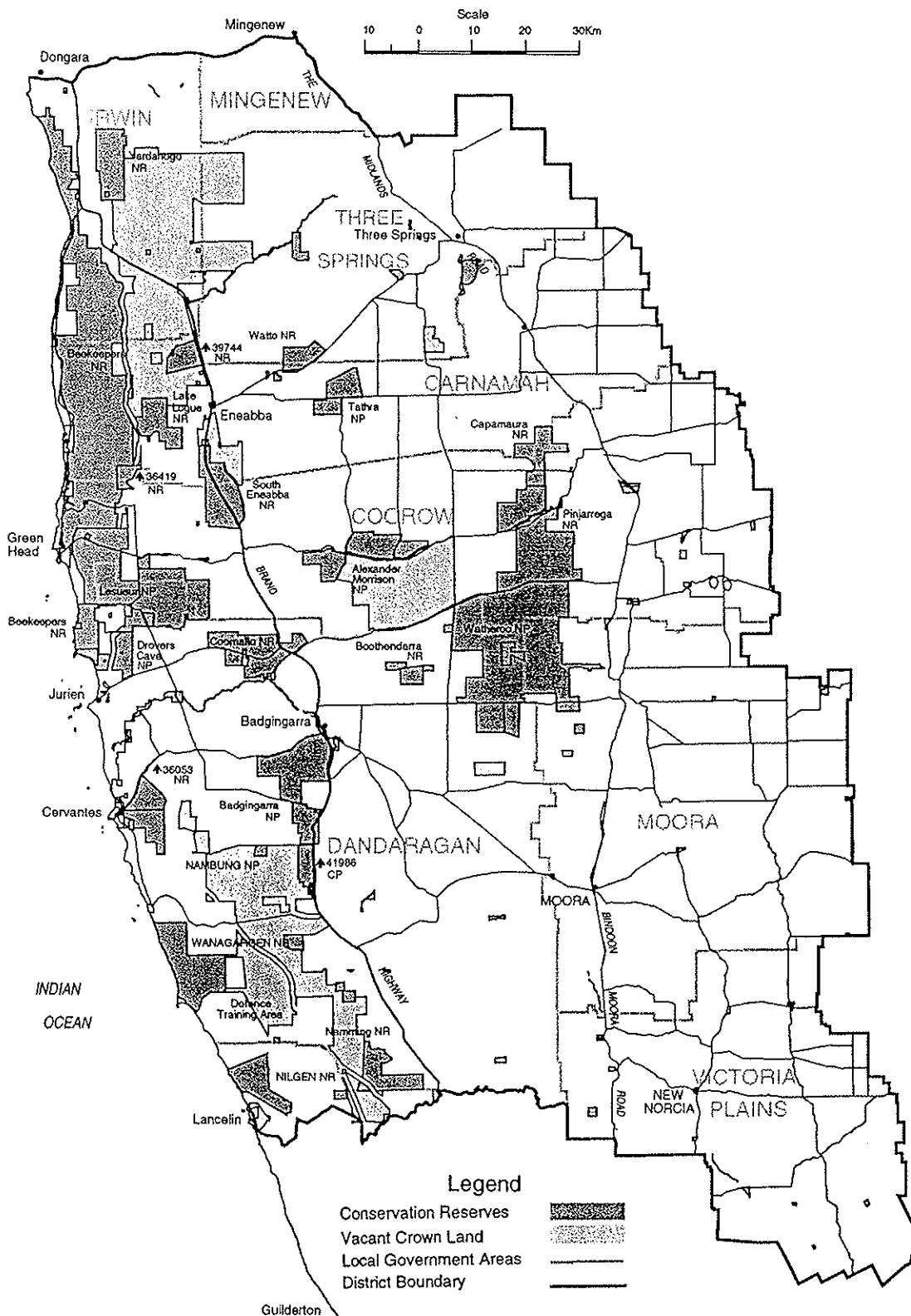
- a distinct entity, that is, the progeny are consistent with the agreed taxonomic limits for that taxon group;
- capable of being self perpetuating, that is, not reliant on the parental taxa for replacement; and
- the product of a natural event, that is, both parents are naturally occurring and cross fertilisation was by natural means.

Protection under Section 23F is achieved by declaring flora to be 'rare flora' 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.

Figure 2. The Moora District covered by this Program



The Schedule published in the Government Gazette is revised annually to accommodate additions and deletions to the list of Declared Rare Flora.

- 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.
- 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.

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

- recent botanical survey has shown that the taxon is no longer rare, in danger of extinction or otherwise in need of special protection;
- the taxon is shown to be a hybrid that does not comply with the inclusion criteria;
- the taxon is no longer threatened because it has been adequately protected by reservation of land where it occurs, or because its 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 1582 taxa (at February 1994) that were poorly known and in need of high priority survey or are adequately surveyed but in need of monitoring. The poorly known taxa are possibly at risk but do not meet the survey requirements for gazettal as Declared Rare Flora (DRF), as outlined in Policy Statement No. 9. Only those plants considered to be threatened or presumed extinct on the basis of thorough survey can be included on the Declared Rare Flora Schedule.

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

##### Priority One - Poorly known Taxa

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

##### Priority Two - Poorly Known Taxa

**Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat** (i.e. 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** (i.e. 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 Moora District;
- Enforcement matters relating to the provisions of the Wildlife Conservation Act are the responsibility of Wildlife Officers in the Midwest Region;
- Implementation and revision of the Management Program is the responsibility of the Moora District Threatened Flora Recovery Team.

### 6. The Moora District

The CALM Moora District runs north from Lancelin (110 km north of Perth) along the coast for 200 km to Dongara. It extends inland on the southern boundary for 120 km to the east and south of Calingiri. On the eastern side it follows the eastern boundaries of the Moora, Coorow, Carnamah and Three Springs Shires until south of Mingenew where the Midlands Road forms the northern boundary west to Dongara. The District is approximately 140 km across at its widest point.

There was formerly an extension 25 km further north of Dongara on the western side, but during the course of work on this program the northern boundary was rationalised, losing that section and including part of the Shire of Mingenew.



CALM's Swan Region bounds the southern side of the District with the Merredin District of the Wheatbelt Region to the east and the Geraldton District to the north, which with the Moora District form the southern part of the Midwest Region. There are nine Shires included within the boundaries of the District, all of the Shires of Three Springs, Carnamah, Coorow, Dandaragan, Moora and Victoria Plains, and parts of the Shires of Irwin, Mingenew and Gingin.

The District covers an area of 25 000 km<sup>2</sup> with eight national parks and more than ninety nature reserves (400 000 hectares of conservation reserves) managed by CALM. It includes the Lesueur National Park, an area long recognised (with the Stirling Range and Fitzgerald River areas) for its diverse flora, with an exceptionally high number of rare and endemic species.

## 6.1 Climate

The climate of the Moora District is Mediterranean with cool, wet winters and hot, dry summers, with a moderately reliable rainfall. Rainfall varies from an average annual rainfall in the south west of the District of about 600 mm at Lancelin, decreasing northwards to 550 mm at Jurien, and around 500 mm at Dongara. It increases to over 650 mm along the escarpment from Mt Lesueur to Dandaragan but generally decreases inland to about 350 mm along the eastern boundary of the District, occurring mainly between May and August. Moora is situated on the border between the drier wheatbelt climate, with less than four wet months in the year, and the moister climate towards the coast, with five wet months annually.

Mean maximum temperatures in this area vary from 30.5° C near the coast to 32.5° C inland, with the mean minimum varying from 9° C to 10° C.

## 6.2 Geology, Landforms and Soils

The western part of the District coincides with the Perth Sedimentary Basin, which is separated by the Darling Fault from the mainly granitic rocks of the Yilgarn Block to the east. The Mesozoic rocks of the Perth Basin are sedimentary, mainly sandstones and siltstones. These are covered patchily by unconsolidated sediments.

The Darling Fault is the most important geological feature in the District, running in a north-south direction and seen as an elongated depression, sometimes known as the Urella Trough, running east of the Urella Fault. It is occupied by a creek originally running south from the Yarra Yarra Lakes south of Three Springs and Lake Eganu, south west of Coorow, joining the Moore river at Moora, which follows the fault south to Mogumber.

A Tertiary or Pleistocene coastline runs 16-32 km inland of the present coast, and south of Jurien Bay this is marked by the Gingin Scarp, which separates the plateau from the coastal plain. A band of Proterozoic sedimentary rocks (the Moora Group) occurs between Moora and Carnamah, immediately east of the fault. These are made up of sandstones, siltstones, limestone and chert rocks.

The soils of the District west of the Darling fault are principally sands whereas those to the east of the Fault are generally heavier loams and gravels.

The Moora District can be divided into five regions:

### *Swan Coastal Plain*

Gently undulating, usually less than 100 m above sea level, with westward or internal drainage. The plain incorporates three subdivisions:

- **Coastal Belt**

Consists of two Quaternary dune systems. The younger of these, the Quindalup Dune System, is formed of fixed and mobile sand dunes, forming a narrow band along the coast. The older, the Spearwood Dune System, consists of dunes lithified to limestone. On the western edge, straight, sandy beaches are separated by low limestone headlands. Caves on the coastal belt have in some cases been formed by water from ponded rivers percolating through the dune limestone, and others may have been formed in the same way.

- Bassendean Dunes

This system runs east of the coastal belt from north of the Hill River, widening towards the south. Leached Pleistocene dunes have a subdued topography, with numerous interdunal swamps. They form a plain behind the coastal belt.

- Eneabba Plain

This includes alluvial fans and part of the coastal belt. The alluvial fans have been built out, particularly in the Eneabba area, where westward-flowing rivers slowed as they decreased in gradient approaching the coastal belt. Some sandy stream channels have blown out to produce dunes.

### *Dissected Region*

Situated between the Gingin and Dandaragan Scarps, a dissected area with westward drainage and with laterite capped remnants of an earlier uplifted plain, forming hills 250-300 m in height, with laterite capping over softer sedimentary rocks. Where the laterite is dissected, breakaways fringe the hills. Resistant Triassic sandstone inland of Jurien Bay produces the mesas of Mt Peron and Mt Lesueur.

### *Dandaragan Plateau*

A flat or gently undulating plateau 200-300 m in elevation, with poorly developed drainage and bounded by the Dandaragan Scarp to the west and the Gingin Scarp to the south west. It is laterite capped, but the laterite on this plateau is still covered by quartz sand. Erosion around the margins of the plateau has produced breakaways.

### *Yarra Yarra Region*

Low lying land to the west of the Darling Scarp, with swamps, lake systems, associated dune deposits and intermittent internal drainage.

### *Darling Plateau*

The Darling Scarp forms the eroded western edge of the Darling Plateau which is expressed as undulating plains on the eastern side of the District, drained in this area by the Moore River. Features of the Plateau include low granitic hills and saline lakes. The Darling Scarp degenerates to a series of low hills by the time it reaches the southern boundary of the District, and these extend north to beyond Moora.

## **References**

Baxter and Lipple (1985), Carter and Lipple (1982), Lowry (1974).

## **6.3 Vegetation**

The CALM Moora District falls within the South-West Botanical Province (Beard 1980) and includes parts of the Irwin, Avon and Darling Botanical Districts. The flora of the District is very diverse, with areas of high species-richness including the northern sandplains and the Gairdner Range.

The Swan Coastal Plain, the Drummond Subdistrict of the Darling Botanical District, extends north from the Moore River to just south of Green Head. Its eastern boundary is the Darling Scarp. It has mainly yellow sandy soils and is low lying, with dune systems and swampy areas. Banksia low woodland occurs on leached sands with melaleuca swamps in wet areas and there are a few areas of jarrah (*Eucalyptus marginata*) and marri (*E. calophylla*) woodland on less leached soils, mainly on the eastern side. In the south, there are rare occurrences of tuart (*E. gomphocephala*) woodland. Scrub heath occurs on limestone, heath with patches of thicket on the sand ridges, and heath in the swamps.

The north east side of the Drummond Subdistrict includes the Dandaragan Plateau which lies between the Gingin Scarp and the Darling Fault from the southern boundary of the Moora District north to about Dinner Hill. The sedimentary rocks of the Plateau give rise in the western half, to brownish sands or loamy sands with gravel beneath, which supported marri woodland, although most has now been cleared as these are good agricultural soils. The eastern half of the Plateau has deep sands, most of which are covered with banksia low woodland, and in the southern part where the sand overlies laterite, there are heaths in which *Dryandra* species are dominant.

South of Moora and to the east of the Darling Fault, running from Mogumber east to New Norcia, the Moora District includes a small section of the northern part of the Dale Subdistrict of the Darling Botanical District. This area has wandoo (*Eucalyptus wandoo*) and York gum (*E. loxophleba*) woodland on lateritic gravels and is part of the Northern Jarrah Forest Subregion, which does not extend further north due to lower rainfall, jarrah only extending to about 10 km south of the southern boundary of the Moora District on the Great Northern Highway. The ridges support dryandra heath.

The north-western part of the District is included in the Irwin Botanical District (the Northern Sandplains Region). This area is underlain by sedimentary rocks, which form a series of plateaux at the same level as the Dandaragan Plateau. These have been eroded on the western side and are broken up by rivers, but the uneroded surfaces form extensive sandplains, supporting rich heathlands, the kwongan or scrub heaths. On the coast, as is found further south, there are two distinct dune systems, corresponding to the Spearwood and Quindalup Systems. The consolidated dunes north from Jurien to the Arrowsmith River support scrub heath on the limestone with illyarrie (*E. erythrocorys*). Further north this species occurs in thickets of *Acacia*, *Melaleuca* and *Allocasuarina*. The Eneabba Plain consists of mineral-rich deposits of beach sands, which support scattered small trees of pricklybark (*E. todtiana*), over tall shrubs and species rich low heath. Where fires are frequent, low shrubs predominate.

Within the Irwin Botanical District lies the Lesueur National Park and Coomallo Nature Reserve which are situated inland from the town of Jurien, ca. 220 km north of Perth. The area has an exceptionally diverse flora, with 800 species, representing nearly 6.2 percent of the State's known vascular flora. The Lesueur National Park has seven species of declared rare flora, nine endemic taxa, 111 regionally endemic taxa and 81 taxa at their northern or southern limits. The heath on the lateritic uplands and sandstones forms an intricate mosaic of vegetation units, whilst deeper soils on lower areas support woodland of wandoo, marri and powderbark wandoo (*E. accedens*).

The southern boundary of the Irwin District runs eastwards through the southerly part of the Watheroo National Park as far east as Dalwallinu. These areas have lower rainfall and on deep sands the *Banksia-Xylomelum* community has shrubs to 3 m (or 6 m if long unburnt) including *Banksia attenuata*, *B. burdettii*, *B. prionotes* and woody pear (*Xylomelum angustifolium*) with *Actinostrobus arenarius* and *Grevillea leucopteris*. From Dalwallinu, the eastern boundary of the Irwin District runs north westwards to Coorow then north through Three Springs. To the east of this boundary lies the Avon Botanical District (the Wheatbelt Region). Two sections of the Avon District occur on the eastern side of the Moora District, with its western boundary approximately along the Darling fault. The southerly section runs from Calingiri north to Moora and Watheroo and east to the Dalwallinu area. Now largely cleared, much of this part of the District originally supported woodland of wandoo and York gum, or York gum and salmon gum on loams, and scrub heath on the sandplains, *Acacia-Allocasuarina* thickets on ironstone gravels and *Melaleuca* thickets and samphires on salt flats.

The northern wheatbelt section occurring in the Moora District is situated from southeast of Coorow, north with its westerly margin along the Midlands Highway, then north from Three Springs. This is similar to the southern section.

## 7. Botanical History of the Moora District

The District was explored by Europeans as early as 1801, when an expedition in the French ship *Naturaliste*, under the command of Captain Hamelin, visited the coast, naming Jurien Bay, Mt Lesueur and Mt Peron, after a naval administrator and the expedition's artist and naturalist, respectively.

After the foundation of the Swan River Colony in 1829, more extensive exploration took place. John Septimus Roe, Surveyor General, led an expedition in 1836 from York, reaching the site of New Norcia after travelling further east. Plant specimens were collected during this expedition.

Capt. George Grey's exploration party marched south in 1839 along the coastal strip from the Murchison River to Perth, after losing their boats at the mouth of the Murchison.

Extensive botanical exploration and collecting was first undertaken by James Drummond who arrived with Captain Stirling's colonising party as honorary Government Naturalist. He settled at Toodyay where he farmed and added to his income by collecting botanical specimens for sale to patrons in Europe. In the summer of 1841 he, with his son and two other settlers, went north from Toodyay to the Victoria Plains, which extend from north-east of New Norcia northwards (Erickson 1969). In 1842 he made two collecting trips to that area, reaching the site of Moora on the first trip and travelling further east to the Wongan Hills (east of the Moora District) on the second.

In 1850 he visited the station of his son, James, at Dandaragan and collected in that area. He continued north with a party overlanding stock from the Swan to Champion Bay (Geraldton) by way of the Lesueur-Coomallo area, where he noted the exceptional richness of the area, and the Arrowsmith and Irwin Rivers.

Ludwig Preiss, a German botanist, visited the Victoria Plains in 1839 and made collections which he distributed to European herbaria on his return to Germany in 1842. They were labelled "Quangen Plains, Victoria" (Lehmann 1844).

L. Diels and E. Pritzel, German botanists, visited Moora on a journey to Geraldton early in 1901, and also visited Dandaragan in December of that year (Diels 1906).

In the east of the District, the Midland Railway reached Moora in 1894, so that land along the line and within easy reach of it was mostly taken up for agricultural settlement by 1900. This was also the case around Dandaragan. At that time the sandplains could not be used for crop farming and there was little settlement between Dandaragan, Watheroo and the coast, apart from fishing settlements at Jurien Bay, Green Head and an isolated farm at Cockleshell Gully. However, advances in farming techniques allowed the sandplains to be worked from the 1950s, further decreasing the remaining areas of natural vegetation.

Charles Gardner, who was appointed Government Botanist in 1929, collected extensively in the District over the next thirty years. He visited the Lesueur area several times between 1931 and 1946 and recommended that the area should be reserved. This important area was subsequently the subject of several studies (Griffin and Hopkins 1985 and Martinick and Associates 1988). A comprehensive report on the Lesueur area was published with much information on the vegetation and flora (Burbidge *et al.* 1990) and in 1992 the Lesueur National Park was gazetted as a Class 'A' reserve for national park.

N. Speck carried out fieldwork in the District for his thesis on the vegetation of the Irwin District (Speck 1958) and John Beard carried out fieldwork for vegetation mapping from 1962 onwards, particularly from 1973-77 (Beard 1976a, 1976b, 1979a, 1979b).

Considerable recent study has been undertaken in the important area of the Northern Sandplains, which is roughly equivalent to the Irwin Botanical District (George *et al.* 1979, Griffin *et al.* 1983, Griffin and Keighery 1989, Griffin 1990, 1992, 1994).

Numerous other studies have been made on a more local scale, many relating to reserves and areas of potential mining in the District (e.g. Bell and Loneragan (1985), Burbidge and Boscacci (1989), Crook *et al.* (1984), Elkington and Griffin (1984), Elkington (1987), Foulds and McMillan (1985), Froend (1988), Griffin (1991), Hopkins and Hnatiuk (1981) and Lamont (1976).

## PART TWO: DECLARED RARE FLORA IN THE MOORA DISTRICT

In 1994, 54 taxa of Declared Rare Flora were known to be extant within the boundaries of the Moora District. Five species listed as presumed extinct on the Declared Rare Flora Schedule are also included. While they have been collected from the Moora District in the past, no extant populations are known.

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

Descriptions of taxa were compiled by consulting references and from discussion with botanists. Distribution and habitat were recorded from Departmental Rare Flora files and records in the Western Australian Herbarium. Emphasis was placed on the particular habitat characteristics of locations in the Moora District. Conservation status was determined from field observations, and population and location data on Departmental files. A brief summary of the number and condition of populations throughout the range of the taxon and threats to population survival is provided. A table for each taxon lists the location, land status, date of last survey, number of plants and condition for populations. The list of known populations generally refers to those in the Moora District only and populations which occur outside the District are not listed but referred to in the description of the species' distribution. Not only populations which have been recently surveyed are included, but also those represented only by a Herbarium specimen if they are from a different locality. These are denoted by an asterisk and are included because they may indicate the former wider range of a species, where it may still occur in as yet undiscovered populations, although some of these are known to have been destroyed since the time of collection.

Precise locality details are contained on Departmental files and a computer database.

Of the 54 extant taxa included in this Program, 30 are endemic to the Moora District. *Grevillea pythara* is not known from the Moora District but occurs just outside it in the Merredin District. It was discovered after the Program for that District was completed and has been included in this Management Program so that it may be included in surveys for further populations that may lie within the Moora District. *Eucalyptus argutifolia* has been included although the only population in the District is not typical, but further survey is important.

During the course of preparation of this Program, survey work has led to the recommendation that five taxa be removed from the Declared Rare Flora Schedule (*Caladenia cristata*, *Diuris recurva*, *Gastrolobium callistachys*, *Grevillea saccata* and *Wurmbea drummondii*) as more populations were discovered, indicating that their conservation status is more secure than was originally thought. These have now been deleted from the Schedule of Declared Rare Flora and are listed as Priority 4 taxa.

On the other hand, two taxa were recommended for declaration as rare flora during the course of preparation of the Program: *Grevillea pythara* and *Verticordia albida*. These have now been listed as Declared Rare Flora. Survey work has also resulted in the known range of two taxa being extended into the District from further south (*Ptychosema pusillum* and *Drakaea elastica*), and in the discovery of 98 new populations of Declared Rare Flora.

## A. Extant Taxa

### *Acacia forrestiana* E.Pritz.

MIMOSACEAE

Forrest's Wattle

*Acacia forrestiana* was first collected from near Dandaragan by Diels in 1901 and named by Pritzel in 1904 in honour of Sir John Forrest. It is closely allied to *A. huegelii*, a species with a more southerly distribution and with a different phyllode shape. *A. forrestiana* is an erect, hairy shrub growing to 1 m high and with hairy branchlets. The phyllodes are obtriangular, 1-2 cm long and 0.5-1 cm wide, with a midrib intersecting the truncate, concave upper margin. The flower heads are globular, pale yellow in colour. The pods are flat, red-brown, 3 cm long and 0.6 cm wide.

**Flowering Period:** October-December

#### Distribution and Habitat in the Moora District

This species is confined to lateritic hills and slopes between Dandaragan and Jurien Bay, a range of ca. 80 km. It grows on laterite and clay loams in heath or low woodland of *Eucalyptus wandoo* and *E. calophylla*, with associated scrub including *Hakea lissocarpa* and *Grevillea*, *Acacia*, *Isopogon*, *Calothamnus* and *Melaleuca* species.

#### Conservation Status

Current: Declared Rare Flora

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Dandaragan	D	Private	25.9.1991	300	Good
2. ENE of Mt Peron	Co	National Park	19.4.1989	50+	Undisturbed
3. ENE of Mt Peron	Co	National Park	19.4.1989	250	Undisturbed
4. E of Mt Peron	Co	National Park, Private	19.4.1989	500+	Undisturbed
5. E of Mt Peron	Co	National Park	19.4.1989	20+	Undisturbed, has not been found recently
6. SE of Mt Lesueur	Co	National Park	6.1989	50+	Undisturbed
7. E of Mt Lesueur	Co	Private	6.1989	70+	Undisturbed
8. N of Mt Peron	Co	National Park	13.6.1993	30+	Partly burnt, divided by graded track, some regeneration occurring
9. NW of Dandaragan	D	Shire Road Reserve	20.8.1993	10+	Relict vegetation, area weed infested
10. NNE of Mt Peron	Co	National Park	8.12.1993	140+	Part of population burnt, some seedlings
11. NNE of Mt Lesueur	D	National Park	24.12.1993	100+	Undisturbed
12. E of Mt Peron	Co	National Park	16.1.1994	100+	Undisturbed
13. NE of Mt Peron	Co	National Park	9.3.1994	300+	Undisturbed
1.* SE of Dandaragan	D	Private	21.9.1988	Small population	Good condition

### Response to Disturbance

The plants are killed by fire, regenerating from seedlings.

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

- Maintain liaison with landowners and land managers.
- Monitor populations regularly.
- Record regeneration of burnt populations.
- Ensure that markers are in place at population 9.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

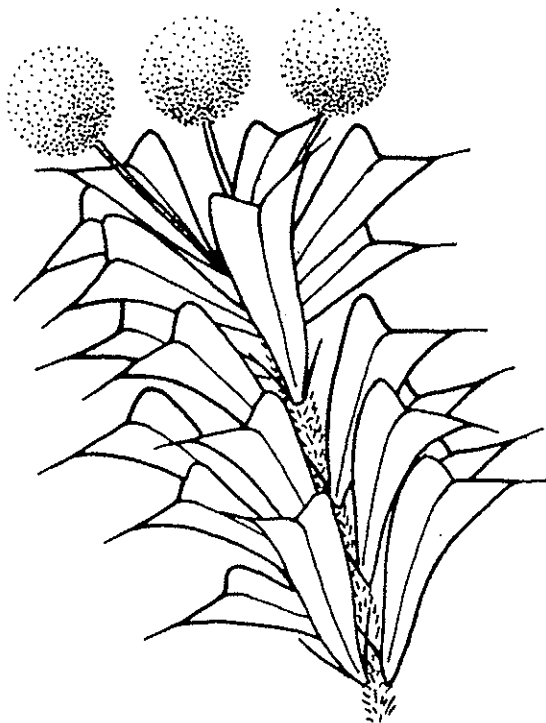
### Research Requirements

- Survey population 14 from south-west of Dandaragan.
- Conduct research on susceptibility to *Phytophthora* species.

### References

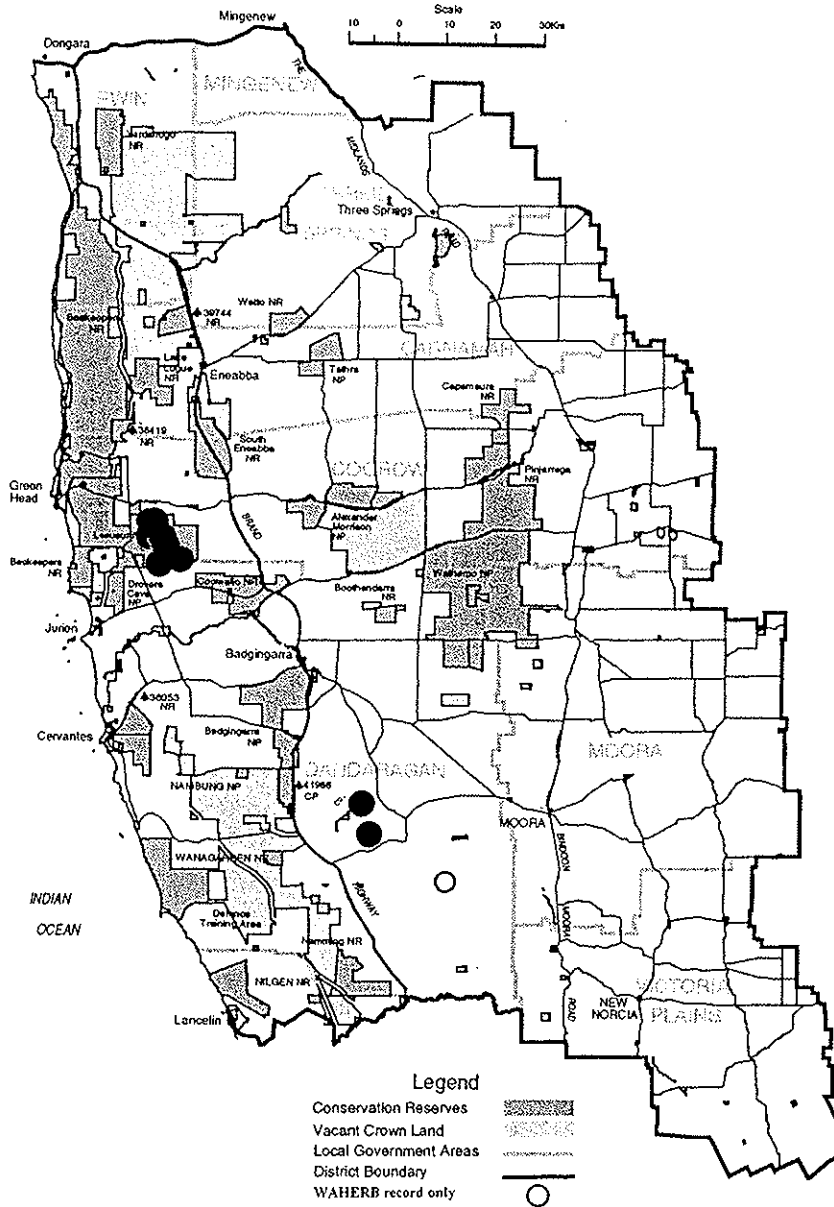
Diels and Pritzel (1904), Hopper *et al.* (1990).

Illustration by B. Jones.



1 cm

*Acacia forrestiana*



● *Acacia forrestiana*



## *Acacia vassalii* Maslin

MIMOSACEAE

Vassal's Wattle

*Acacia vassalii* was described in 1978 and named in honour of Dr Jacques Vassal. At that time it was known from only three collections, the earliest made from Wongan Hills in 1935, the others from unknown localities.

This species is a low spreading shrub up to 0.6 m in height, which forms a low, dense cushion up to 1 m in diameter when growing in open areas, but is more diffuse and upright when shaded by other shrubs. The phyllodes are distinctive, 4-8 mm long by 1 mm wide, slightly horizontally flattened and with hooked tips. The flower heads are yellow and globular and the pods are up to 2 cm long and 0.1-0.15 cm wide.

**Flowering Period:** June-August

### **Distribution and Habitat in the Moora District**

Known from only four populations, one in the Wongan Hills area, Merredin District (population 1), and three others in the Moora District, one to the east of Moora, the other two north-east of Watheroo, a total range of ca. 85 km. The population in the Merredin District which is located on an education reserve has declined in recent years from eight plants to one.

Within the Moora District the southerly populations have been recorded over 7 km. The main population (population 2) occurs over 5 km on road and rail reserve. A population of ten plants 2.5 km south of this population (population 3) has not been refound recently despite several searches. The location is on very narrow road reserves with heavy weed infestation. The most northern populations have been discovered recently and require further survey. *A. vassalii* grows in low scrub and heath on brown sand with gravel over laterite or on yellow sand. Associated species include *Allocasuarina campestris*, *A. drummondiana*, *Dryandra frazeri*, *D. carlinoides*, *Astroloma serratifolium* and *Hakea* and *Drosera* species. The northerly population grows with *Actinostrobos arenarius*, *Ecdiocollea monostachya* and *Grevillea integrifolia* subsp. *biformis*.

### **Conservation Status**

Current: Declared Rare Flora

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
2. E of Moora	Mo	Shire Road Reserve, Railway Reserve	30.7.1991	100 est.	Mainly good, some disturbance and weeds
3. SE of Moora	Mo	Shire Road Reserve	11.7.1986	10 in 1986	Population has not been found recently
4. NE of Watheroo	Mo	Shire Road Verge ?Water Reserve	27.10.1992	-	Good

### **Response to Disturbance**

Plants adjacent to the graded road edge and in open areas appear larger and healthier than those in shaded situations, where they are often more diffuse, upright and partly dead. Most plants at population 2 were originally seen on or near a track between the road and railway. The rail and road reserve where the population occurs had been burnt annually prior to the discovery of the population. This species is probably a disturbance opportunist.

## Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

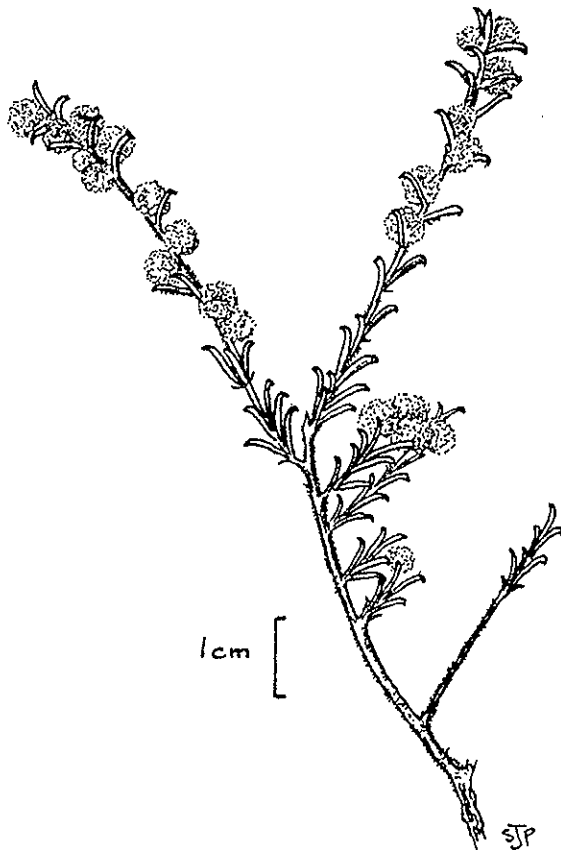
- Monitor populations regularly.
- Maintain liaison with managers of land on which the population occurs.
- Establish markers at population 4.
- Weed control may be required at population 2.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### Research Requirements

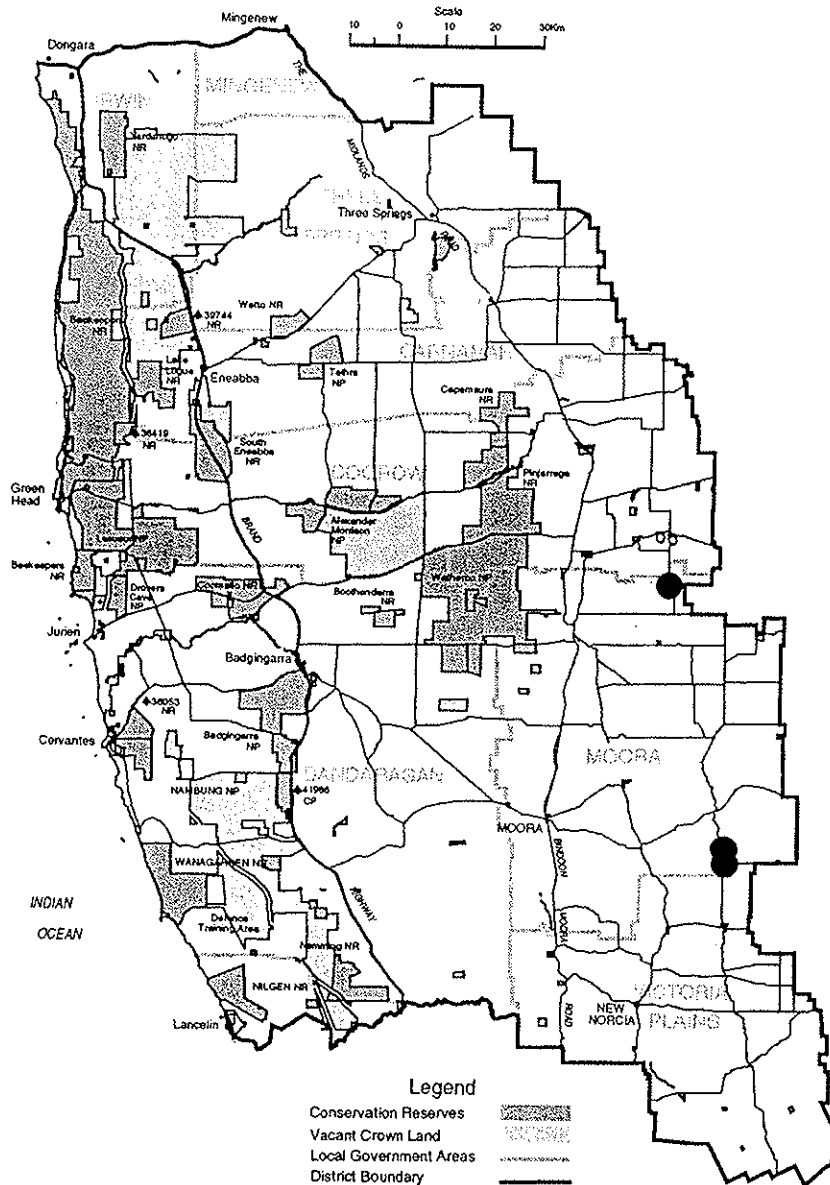
- Survey for new populations, primarily on reserves between the known populations in suitable habitat particularly after fire or other disturbance.
- Conduct research on fire response and susceptibility to *Phytophthora* species.
- Survey population 4 to establish area of population, number of plants and land status.
- Further survey in the area of population 4 for new populations.

### References

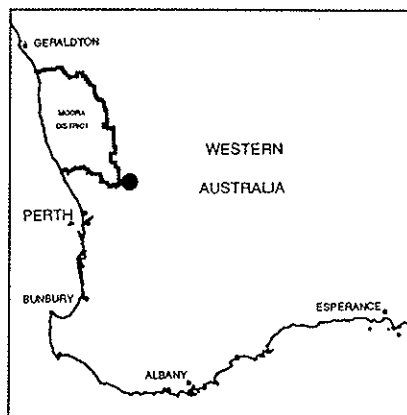
Hopper *et al.* (1990), Maslin (1978).



*Acacia vassalii*



● *Acacia vassalii*



Locality Map

## *Acacia* sp. Dandaragan (S.van Leeuwen 269)

MIMOSACEAE

### Dandaragan Wattle

A tall, spindly shrub 1-4 m tall, or rarely a tree 5-6 m. The branchlets are thick, slightly angled and pruinose. The phyllodes are glaucous, either oblong to elliptic, or falcate in shape, broadest near or above the middle, 6-11 cm long and 3-7 cm wide. The flower heads are oblong to globular, golden in colour and are arranged in racemes 3-8 cm long. Each flower head has 35-55 flowers. The pods are up to 14 cm long and 9-12 mm wide, flat and little constricted between the seeds. This taxon has an affinity to *Acacia microbotrya* with which it seems to intergrade. It differs in the pruinose branchlets, raceme length, flower head shape and colour, but there is a wide range of variation within the taxon. It appears to be a good species but its relationship with *A. microbotrya* needs to be clarified (B. Maslin, personal communication).

**Flowering Period:** August-September

### Distribution and Habitat in the Moora District

Known from two populations, 8 km apart. One large population in the Badgingarra-Dandaragan area is on private land and a road reserve and is of 100+ plants, and the smaller population ca. 8 km further north is on private land which is retained as a private nature reserve. This population has not been fully surveyed and at present has been noted only as being of a few plants. At population 1 the taxon grows on a lateritic breakaway system, in brown gravelly loam along the upper slopes of the breakaway. The plants grow in low woodland of *Eucalyptus calophylla* and *E. loxophleba* with low scrub including *Xanthorrhoea* species, *Hakea erinacea* and *Calothamnus quadrifidus*.

### Conservation Status

Current: Declared Rare Flora

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. NW of Dandaragan	D	Private, Shire Road Reserve	26.9.1991	100+	Good
2. NNW of Dandaragan	D	Private	1992	"a few"	-

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Presumed not susceptible

### Management Requirements

- Monitor populations regularly.
- Assess the part of population 1 on private land to determine whether grazing is causing damage, and if so, fence the population.
- Protect populations from frequent fire, where possible, until fire response is known.
- Continue efforts to acquire for a conservation reserve, part of the large road reserve on which population 1 occurs.
- Maintain liaison with landowners and local government authority.

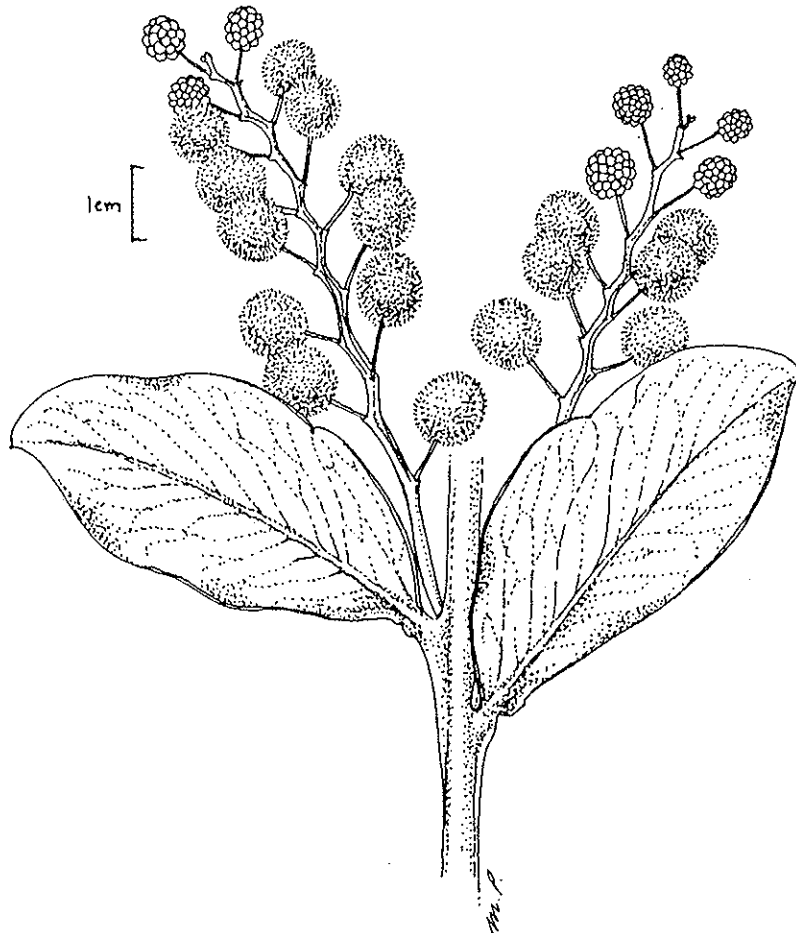
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

#### Research Requirements

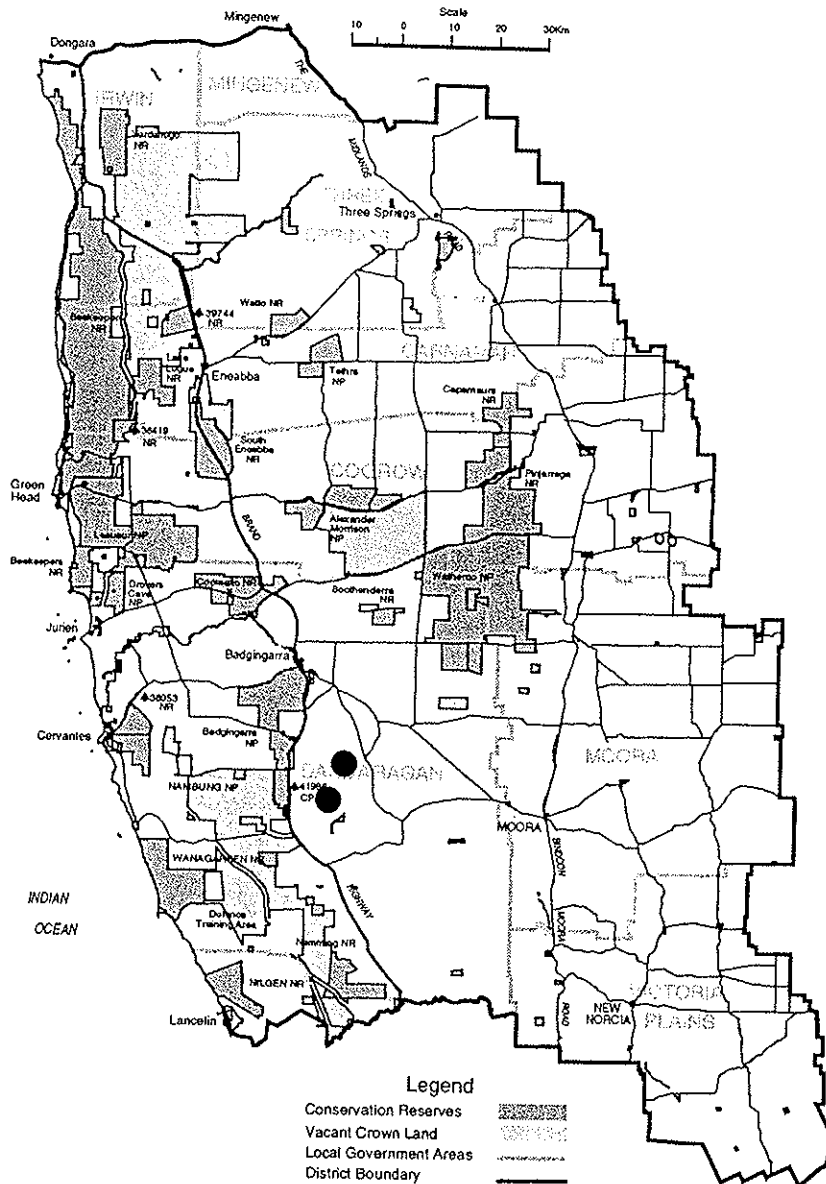
- Conduct electrophoretic research to elucidate the relationship with *A. microbotra*.
- Conduct research to determine the fire ecology of the species and its susceptibility to *Phytophthora* species.
- Conduct further survey at population 2 to establish the full extent of the population, provide habitat details and voucher specimens.

#### References

Hopper *et al.* (1990).



*Acacia* sp. Dandaragan (S.van Leeuwen 269)



● *Acacia* sp. Dandaragan (S.van Leeuwen 269)

*Anigozanthos humilis* Lindl. subsp. *chrysanthus* Hopper

HAEMODORACEAE

Golden Catspaw

A robust herb, with flat, curved leaves to ca. 20 cm long, 15 mm wide. The flowering stem is 20-40 cm tall, with the flower head solitary on a simple or rarely once to twice-branched stalk. The perianth is tubular towards the base, with six lobes, the inner horizontal, the outer reflexed upwards. It is yellow in colour, with a dense covering of feathery hairs on the outside and is 2-3.5 cm long. There are six stamens, joined to the perianth near the base of the lobes at three levels on the perianth, the outer stamens being lowest. The style is up to 42 mm long. The fruit is dry with several black seeds in each compartment.

This subspecies differs from subsp. *humilis* in the shorter, uniformly yellow perianth, and in its taller stature. It intergrades with subsp. *humilis* to the north, south and west of its range.

**Flowering Period:** September-October

**Distribution and Habitat in the Moora District**

Occurs in a small area at the foot of the Darling Scarp near Mogumber over a range of ca. 7 km. The southernmost part of the population extends into the Swan Region where it is well represented on a nature reserve. It also occurs to the west of Mogumber in the Swan Region on a nature reserve, road reserve and private property and further south near Wannamal. There is a population of 73 plants ca. 75 km further to the south-east in the Swan Region on a shire reserve near Toodyay and an unconfirmed population ca. 20 km further south of this.

Grows in yellow brown or white sand, sandy loam or clay loam, in heath, sometimes below open low banksia and eucalypt woodland. Associated species include *Banksia prionotes*, *B. menziesii*, *B. attenuata*, *Eucalyptus calophylla*, *E. wandoo*, *Allocasuarina humilis* and *Hibbertia hypericoides*.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Mogumber	VP	Rail Reserve, MRWA Road Reserve	28.9.1994	383	Burnt previous year, some weed infestation
2. N of Gillingarra	VP	-	1984	15	-
3. Mogumber	VP	Shire Recreation Reserve	2.7.1992	8	Good

**Response to Disturbance**

Flowers best after dry-season fire.

**Susceptibility to *Phytophthora* Dieback**

Unknown

### Management Requirements

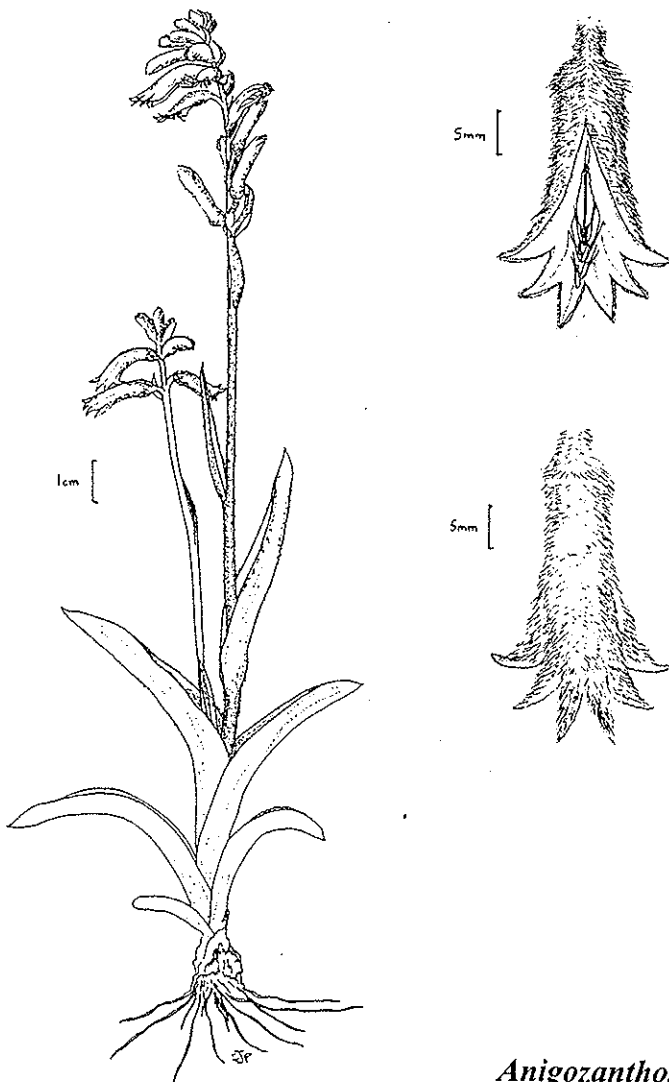
- Monitor populations at regular intervals.
- Continue liaison with land owners and managers.
- Conduct weed control at population 1 if necessary.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### Research Requirements

- Further survey to refind population 2 north of Gillingarra.
- Conduct research on susceptibility to *Phytophthora* species.

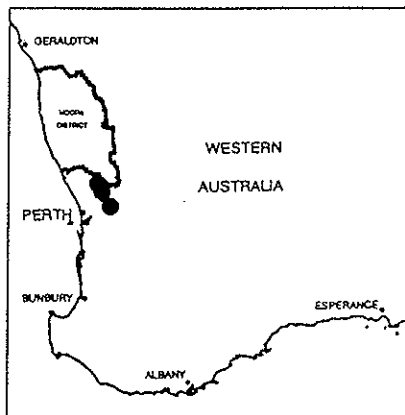
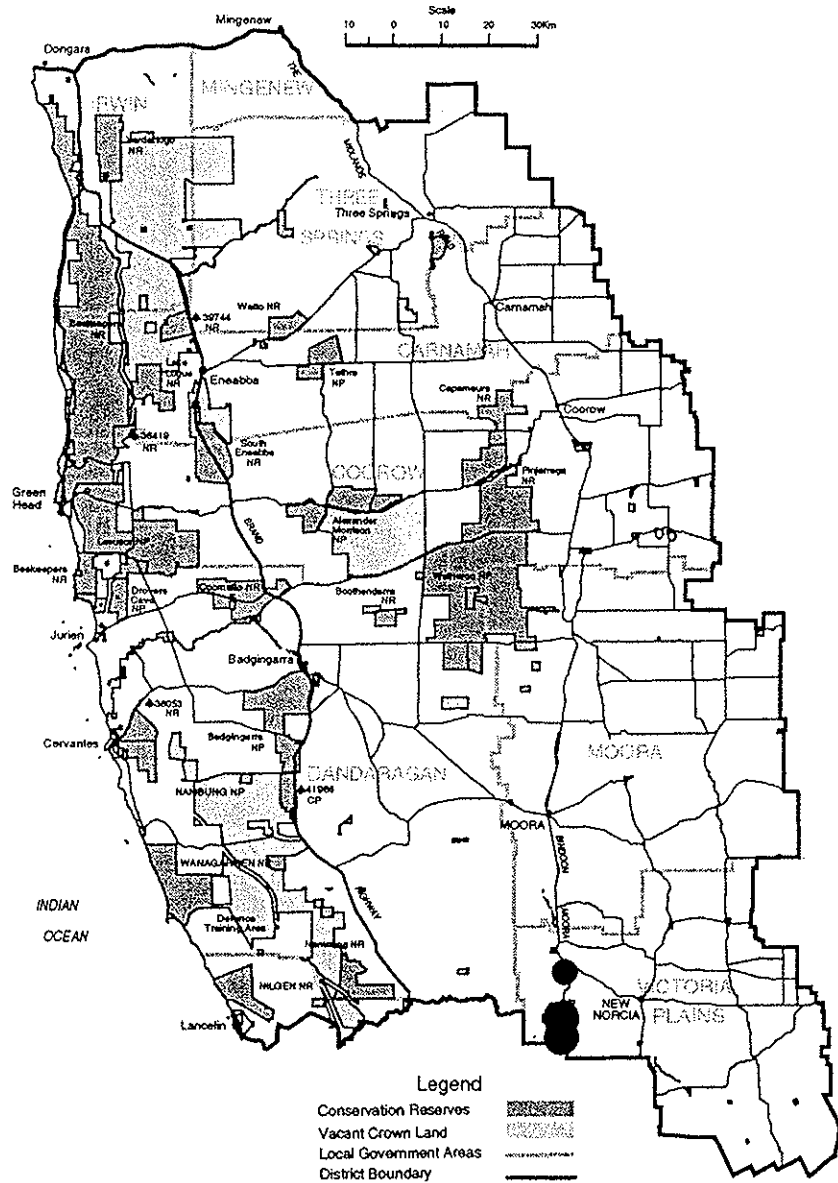
### References

Hopper (1987, 1993), Hopper *et al.* (1990).



*Anigozanthos humilis* subsp. *chrysanthus*





Locality Map

● *Anigozanthos humilis* subsp. *chrysanthus*

*Anigozanthos viridis* Endl. subsp. *terraspectans* Hopper

HAEMODORACEAE

Dwarf Green Kangaroo Paw

A dwarf rhizomatous herb with leaves which are subterete, 5-10 cm long and 0.1-0.2 mm wide. The flowering stem is 10-15 cm tall, not upright but arising at a 45-80 degree angle. The flowers open away from the flower stalk and are curved, with the margins parallel or constricted above the middle. The six lobes are reflexed and the flower is green in colour with a covering of feathery hairs on the outside of the perianth. This is 4.5-6 cm long and 4-5 mm wide at the narrowest point above the middle. The six stamens are in two rows, with the outer pair lower than the four inner stamens. The seeds are grey-brown in colour. Differs from subspecies *viridis* in the short flowering stems and the shorter, narrower flower.

**Flowering Period:** August-December

**Distribution and Habitat in the Moora District**

This species has been found in an area west of Cataby in five populations over a geographical range of about 20 km, but was not re-found during this survey. The areas in which it was known to occur had not been burned recently and the species was not found at those localities, although it may have been present as seed in the soil. Two of the known localities were not visited as the locality descriptions are not precise, and they were not re-found with certainty. Another population has been reported from north-west of Cataby (population 4) but location information was not precise and it may have been one of the known populations.

Occurs in winter-wet depressions where it grows on grey sandy clay loam or grey sand, in low post-fire regenerating heath. Occurs with *Banksia leptophylla*, species of *Melaleuca*, *Verticordia densiflora*, *Conostylis* species and sedges.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. & ?4. Emu Lakes	D	Private	13.11.1979	< 100	-
2. SW of Emu Lakes	D	Nature Reserve	22.10.1980	210+	-
3. SW of Emu Lakes	D	VCL	22.10.1980	200+	-
5. Wongonderra Road	D	Private, Shire Road Reserve	20.9.1989	500+	Vigorous, dieback present near this locality in 1989
6. Wolka Road	D	VCL (Mining Lease), Shire Road Reserve	19.12.1988	800-1000	Flowered in 1988, not seen since

**Response to Disturbance**

Present at population 6 only on a disturbed firebreak. Flowers best after a dry season fire and is a short-lived post-fire opportunist, regenerating from seed.

**Susceptibility to *Phytophthora* Dieback**

Unknown

### Management Requirements

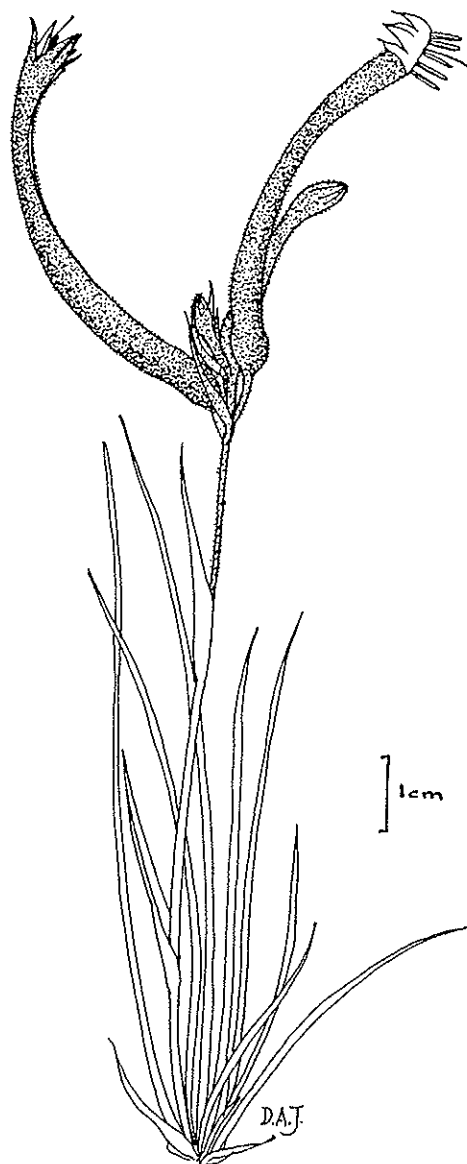
- Ensure that road markers are in place at populations 5 and 6.
- Monitor populations regularly, particularly after fire.
- Liaise with landowners and land managers at populations 1, 5 and 6.
- Monitor progress of dieback in relation to population 5.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### Research Requirements

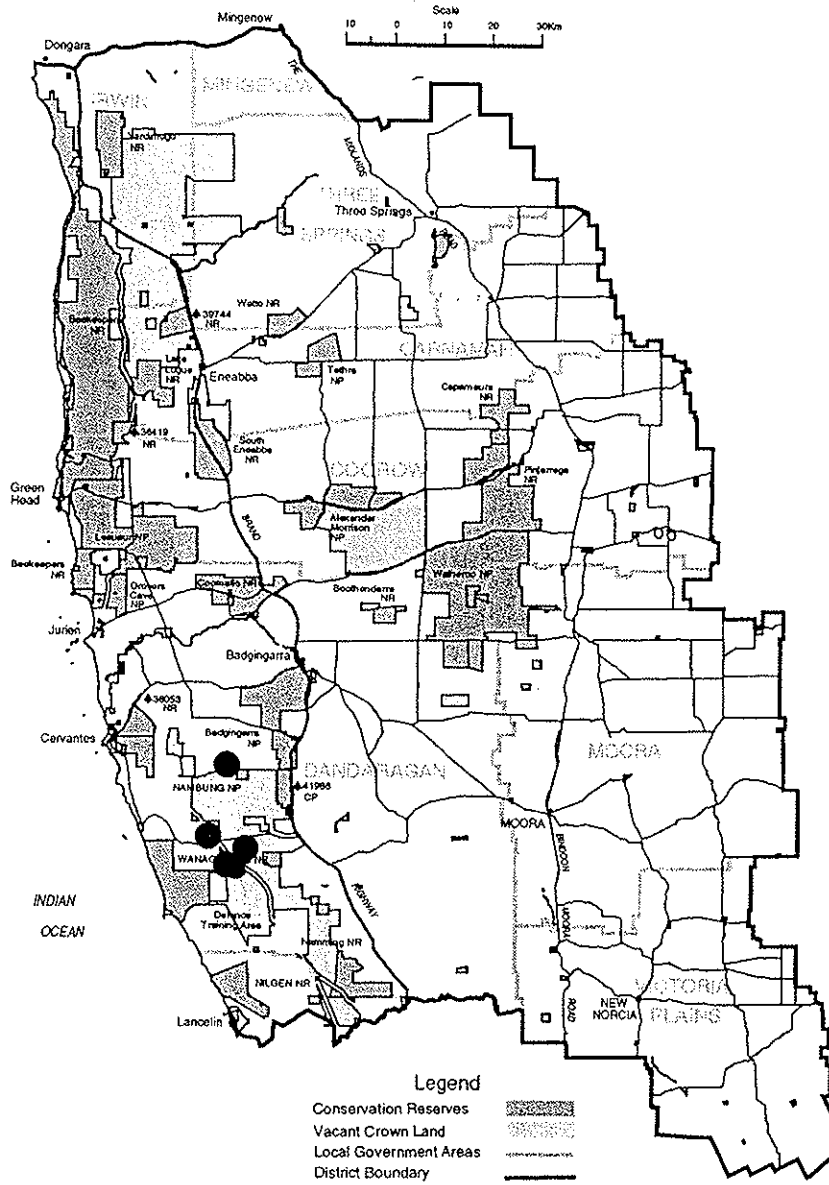
- Conduct further survey for new populations in suitable habitats, particularly after fire.
- Resurvey populations 1-3 and 6 and obtain accurate grid references for these populations.
- Research is required on the fire response of the species.
- Conduct research on susceptibility to *Phytophthora* species.

### References

Hopper (1987, 1993), Hopper *et al.* (1990).



*Anigozanthus viridis* subsp. *terraspectans*



● *Anigozanthus viridis* subsp. *terraspectans*

*Asterolasia drummondii* Paul G. Wilson

RUTACEAE

Gairdner Range Starbush

This species was first collected from Mt Lesueur by James Drummond in 1854 and was rediscovered there by Charles Gardner in 1949. It was included in Bentham's "Flora Australiensis" (1863-1878) as *Asterolasia phebalioides* after earlier descriptions as *Urocarpus phebalioides* (1855) and *Eriostemon drummondii* (1859). Gardner (1931) listed it as *Pleurandropsis phebalioides*. In 1971 it was regarded by Wilson that *Urocarpus* had priority, having been published first, and the combination *Urocarpus phebalioides* was made. The species was known by this name until 1987 when the nomenclatural change was made to *Asterolasia drummondii* as a result of further evidence that *Asterolasia* had been published several months before its synonym *Urocarpus*.

*A. drummondii* is an erect single stemmed shrub to 45cm tall, with the flowers, stems and leaves having brown star-shaped hairs. The leaves are up to 2 cm long and 1 cm wide, oblong or ovate in shape. The flowers have stalks 1-2 cm long and are clustered in the upper leaf axils, or terminally. Each flower is ca. 1 cm in diameter and has five white petals. There are ca. 10-15 yellow stamens. The fruit consists of two beaked carpels.

**Flowering Period:** July-September

**Distribution and Habitat in the Moora District**

Occurs between Dandaragan and the Gairdner Range near Jurien, where it grows on lateritic hills in sandy clay or loam in low heath, or in the understorey of open woodland of *Eucalyptus drummondii* or *E. lane-poolei*. Associated shrubs include species of *Calothamnus*, *Dryandra*, *Petrophile*, *Acacia* and *Hakea*.

**Conservation Status**

Current: Declared Rare Flora<sup>#</sup>

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SE of Cataby	D	Nature Reserve, Gravel Reserve, Shire Road Reserve	30.7.1991	5000+	Good, rehabilitation work carried out in gravel reserve
2. NE of Mt Lesueur	Co	National Park	19.4.1989	1000+	Good, near boundary firebreak
3. NE of Mt Michaud	D	National Park	23.9.1992	500+	Good, undisturbed
4. Mt. Michaud	D	National Park	?1986	500 est.	-
5. Mt. Lesueur	D	National Park	?1986	30	-
6. SE of Mt Peron	D	National Park	6.1989	1500+	Recently burnt
7. SE of Cockleshell Gully	D	National Park	?1986	50 est.	-
8. NE of Mt Lesueur	D	National Park	6.1989	400+	-
9. NNW of Cockleshell Gully	D	National Park	6.1989	20+	-
10. W of Dandaragan	D	Private	20.9.1988	Common-WH	Good

**Response to Disturbance**

Has regenerated well in a disused gravel pit, and on firebreaks in other areas, appearing to be a disturbance opportunist. Thought to be killed by fire, regenerating from seed.

<sup>#</sup> now Priority 4 (updated at December 1999)

## Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

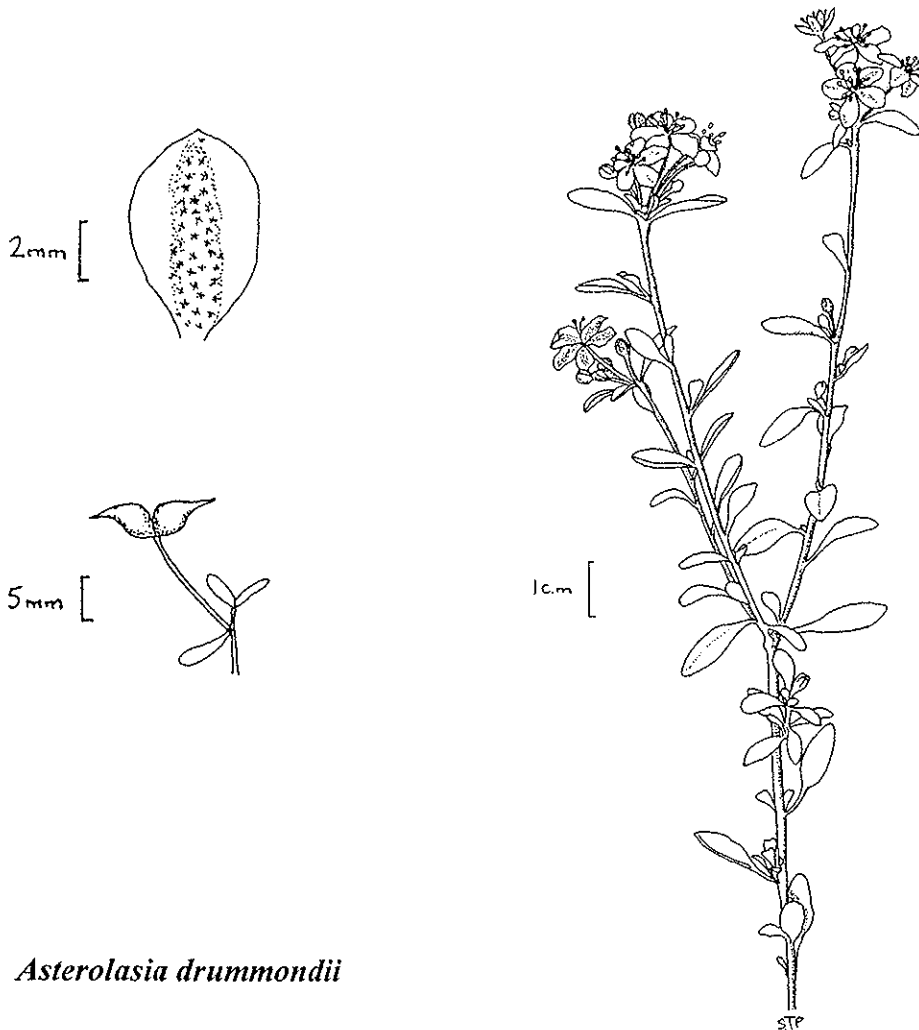
- Monitor populations regularly.
- Liaise regularly with landowners and land managers.
- Ensure that population 2 is protected during firebreak maintenance activities.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### Research Requirements

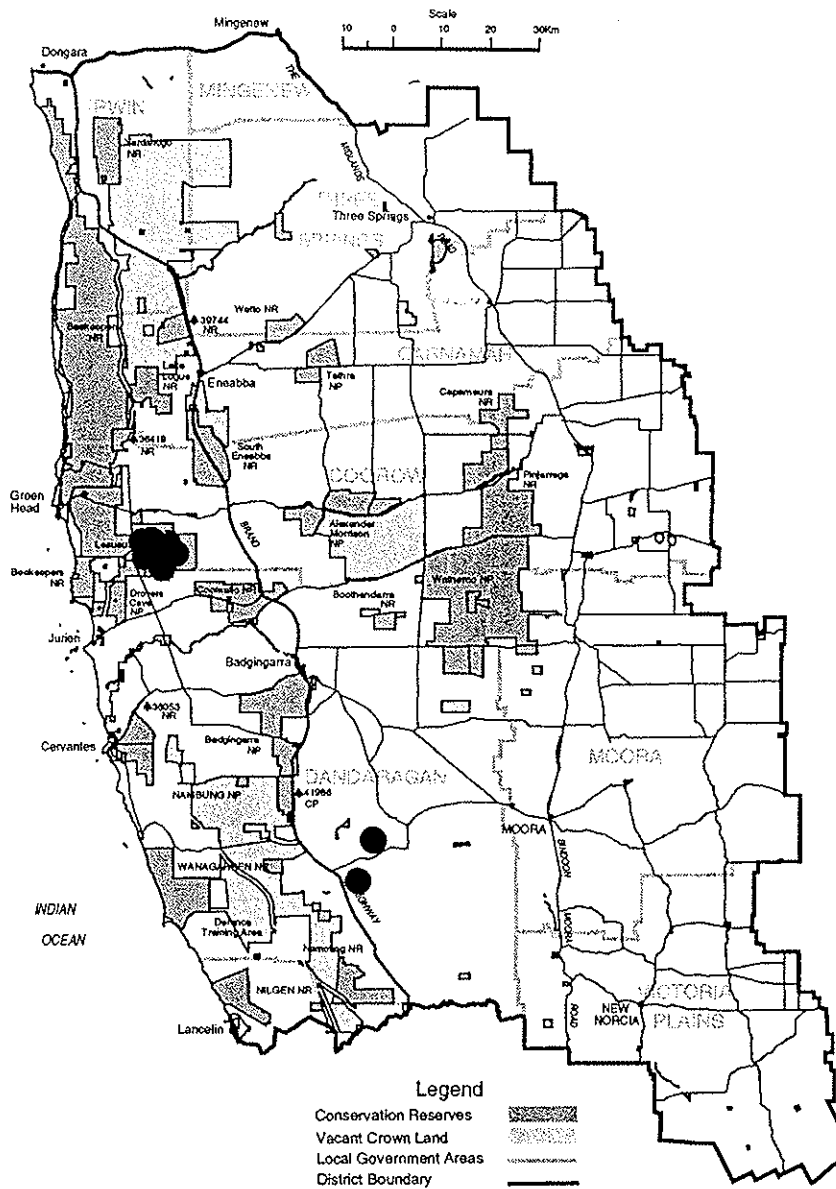
- Survey population 10 to establish number of plants and extent of population.
- Resurvey populations in the Lesueur National Park to establish current population sizes.
- Conduct research on the susceptibility of this species to *Phytophthora* species.
- Conduct research on population biology and fire response.

### References

Bentham (1863-1878), Gardner (1931), Hooker (1855), Mueller (1859), Perry (1971), Rye and Hopper (1981), Wilson (1971, 1987).



*Asterolasia drummondii*



● *Asterolasia drummondii*

## *Banksia tricuspis* Meisn.

PROTEACEAE

Lesueur Banksia, Pine Banksia

A small tree or shrub to 4 m in height with grey-brown bark. The foliage is distinctive, the leaves are crowded and scattered, pine-like in appearance, each leaf 10-15 cm long and 0.1-0.2 cm wide, with inrolled margins and a notched tip which is roughly three-pointed, a character reflected in the name of the species. The flowering cones are cylindrical, and up to 20 cm long and 10 cm in diameter. The flowers are bright yellow in colour. The fruiting cones shed the dead flowers to expose numerous smooth follicles.

This is a distinctive species, distinguished by its tree-like, stunted habit, the leaves which are linear, each having a three-toothed apex, and which are crowded at the ends of the branches, and by the conspicuous, golden inflorescences.

**Flowering Period:** May-September

### **Distribution and Habitat in the Moora District**

Restricted to rocky slopes, hilltops and gullies in the Lesueur area near Jurien where survey by van Leeuwen has located 72 populations with a total of ca. 19000 plants, over a geographic range of ca. 15 km.

*Banksia tricuspis* grows as an emergent amongst low or tall shrubland, or itself forming an open woodland. It grows sometimes in very shallow soil from crevices in sandstone rock, or on deeper soils derived from laterite or sandstone. Associated species include *Hakea neurophylla*, *Banksia grossa* and *B. micrantha*. A single population occurs on flat sandplain country with *Banksia attenuata*, *B. menziesii* and *Eucalyptus todtiana*. Survey of this species was carried out in 1980 (Lievens 1981) and research on the reproductive biology, genetic diversity and conservation status of the species has been undertaken by S. van Leeuwen, who carried out more extensive survey of the species throughout its range.

### **Conservation Status**

Current: Declared Rare Flora<sup>#</sup>

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. NNE of Mt Peron	Co	Private	28.4.1989	24	Undisturbed, fenced by property owner
2. NNE of Mt Peron	Co	Private	2.3.1987	38	Undisturbed
3. NE of Mt Peron	Co	Private	28.4.1989	169	Some disturbance by mining, fenced by property owner
4. NNE of Mt Peron	Co	Private	10.2.1987	13	Undisturbed
5. NE of Mt Peron	Co	Private	2.3.1987	21	Undisturbed
6. NE of Mt Peron	Co	National Park, Private	24.6.1988	2	Undisturbed
7. NNE of Mt Peron	Co	National Park	17.6.1988	14	Undisturbed
8. NE of Mt Peron	Co	National Park	24.6.1988	79	Undisturbed
9. NE of Mt Peron	Co	National Park	17.7.1988	26	Undisturbed
10. NE of Mt Peron	Co	National Park	16.6.1987	3	Undisturbed
11. ENE of Mt Peron	Co	National Park, Private	17.7.1989	304	Some damage to plants along fenceline

<sup>#</sup> now Priority 4 (updated at December 1999)



Populations Known in the Moora District (Cont'd)

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
12. ENE of Mt Peron	Co	National Park, Private	1988-89	-	One plant destroyed during fencing
13. ENE of Mt Peron	D	National Park	12.10.1987	1018	Undisturbed, 2 seedlings present
14. E of Mt Peron	D	National Park	5.3.1988	47	Burnt in 1985, 5 seedlings present
15. E of Mt Peron	Co	National Park	15.3.1988	10	Burnt in 1985
16. E of Mt Peron	Co	National Park	18.6.1989	45	Burnt in 1985
17. ESE of Mt Peron	D	National Park	9.8.1988	282	267 plants burnt in 1985
18. SE of Mt Peron	D	National Park	15.5.1988	361	116 plants burnt in 1985
19. ESE of Mt Peron	D	National Park	17.6.1988	62	Burnt in 1985
20. NNE of Mt Lesueur	D	National Park	17.6.1988	113	83 plants burnt in 1985
21. N of Mt Lesueur	D	National Park	21.6.1988	228	28 plants burnt in 1985
22. N of Mt Lesueur	D	National Park	21.6.1988	8	Burnt in 1985
23. N of Mt Lesueur	D	National Park	21.6.1988	7	Burnt in 1985
24. NNE of Mt Lesueur	D	National Park	21.6.1988	147	Burnt in 1985
25. NNE of Mt Lesueur	D	National Park	21.6.1988	247	243 plants burnt in 1985
26. NNE of Mt Lesueur	D	National Park	26.6.1988	33	Burnt in 1985
27. NNE of Mt Lesueur	Co	National Park	5.10.1988	24	Burnt in 1985
28. N of Mt Lesueur	D	National Park	31.3.1987	4150	195 plants burnt in 1985
29. NNE of Mt Lesueur	Co	National Park	5.5.1988	2	Burnt in 1985
30. NNE of Mt Lesueur	Co	National Park	5.5.1988	3	Burnt in 1985
31. NNE of Mt Lesueur	D	National Park	11.6.1988	1698	340 plants burnt in 1985
32. N of Mt Lesueur	D	National Park	31.3.1987	24	Undisturbed
33. S of Mt Peron	D	National Park	10.2.1988	6	Undisturbed
34. NNW of Mt Lesueur	D	National Park	9.3.1988	69	Burnt in 1985
35. NNW of Mt Lesueur	D	National Park	9.3.1988	220	81 plants burnt in 1985
36. N of Mt Lesueur	D	National Park	9.3.1988	311	255 plants burnt in 1985
37. N of Mt Lesueur	D	National Park	26.10.1987	52	Burnt in 1985
38. NNE of Mt Lesueur	D	National Park	15.8.1987	2	Undisturbed
39. NNE of Mt Lesueur	D	National Park	16.8.1987	10	Undisturbed
40. NE of Mt. Lesueur	D	National Park	5.6.1988	87	Undisturbed
41. NNE of Mt Lesueur	D	National Park	10.6.1988	2776	130 plants burnt in 1985
42. NE of Mt Lesueur	D	National Park	17.6.1988	373	262 plants burnt in 1985
43. NE of Mt Lesueur	D	National Park	18.4.1988	48	14 plants burnt in 1985
44. N of Mt Lesueur	D	National Park	31.3.1988	255	Burnt in 1985
45. N of Mt Lesueur	D	National Park	26.10.1988	964	770 plants burnt in 1985
46. NNE of Mt Lesueur	D	National Park	27.10.1988	89	Burnt in 1985
47. NNE of Mt Lesueur	D	National Park	31.3.1988	6	5 plants burnt in 1985
48. NE of Mt Lesueur	D	National Park	18.4.1988	183	Undisturbed
49. NE of Mt Lesueur	D	National Park	1.12.1987	153	Undisturbed
50. ENE of Mt Lesueur	D	National Park	25.7.1988	286	Disturbed by mining exploration
51. NW of Mt Lesueur	D	National Park	17.4.1988	5	4 plants burnt in 1985
52. NW of Mt Lesueur	D	National Park	18.4.1988	975	930 plants burnt in 1985
53. N of Mt Lesueur	D	National Park	17.5.1988	3	Burnt in 1985
54. N of Mt Lesueur	D	National Park	26.10.1987	13	Burnt in 1985
55. NE of Mt Lesueur	D	Private	18.4.1988	38	Regenerating from lignotubers after clearing
56. ENE of Mt Lesueur	D	National Park	17.6.1988	8	Undisturbed

### Populations Known in the Moora District (Cont'd)

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
57. ENE of Mt Lesueur	D	National Park	17.6.1988	24	Some plants destroyed by seismic track
58. ENE of Mt Lesueur	D	National Park	17.4.1987	48	Undisturbed
59. NW of Mt Lesueur	D	National Park	15.12.1987	5	Plants scorched in 1985 fire
60. N of Mt Lesueur	D	National Park	21.6.1988	443	Burnt in 1985
61. NNE of Mt Lesueur	D	National Park	17.4.1988	17	Burnt in 1985
62. ENE of Mt Lesueur	D	National Park	18.4.1988	102	Undisturbed
63. ENE of Mt Lesueur	Co/D	National Park	11.3.1988	97	Undisturbed
64. E of Mt Lesueur	Co	National Park	15.5.1988	108	Undisturbed
65. Mt Lesueur	D	National Park	18.4.1988	1503	1316 plants burnt in 1985
66. NNE of Mt Lesueur	D	National Park	17.3.1988	3	Burnt in 1985
67. NE of Mt Lesueur	D	National Park	17.3.1988	88	Burnt in 1985
68. ENE of Mt Lesueur	D	National Park	15.5.1988	108	92 plants burnt in 1985
69. E of Mt Lesueur	D	National Park	15.5.1988	125	19 plants burnt in 1985
70. E of Mt Lesueur	D	National Park	15.5.1988	122	118 plants burnt in 1985
71. E of Mt Lesueur	D	National Park	16.5.1988	5	4 plants burnt in 1985
72. SE of Mt Lesueur	D	National Park	16.5.1988	98	17 plants burnt in 1985

#### Response to Disturbance

The plant resprouts from the lignotuber and epicormic buds. Many populations of this species were completely or partially burnt by a wildfire in autumn 1985. Observations suggest that seedlings are killed by fire and do not tolerate burning until at least 20 years of age. It was found (Lamont and van Leeuwen 1988) that all viable seeds were released in response to an autumn wildfire, and that seedling establishment only occurred immediately after the fire. It was also found that most plants in a study population flowered in the nineteenth year after fire. Most flower heads were destroyed by moth larvae and larval seeking cockatoos, with beetle larvae destroying 15% of mature seeds. Burning is required for follicle rupture.

#### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

#### Management Requirements

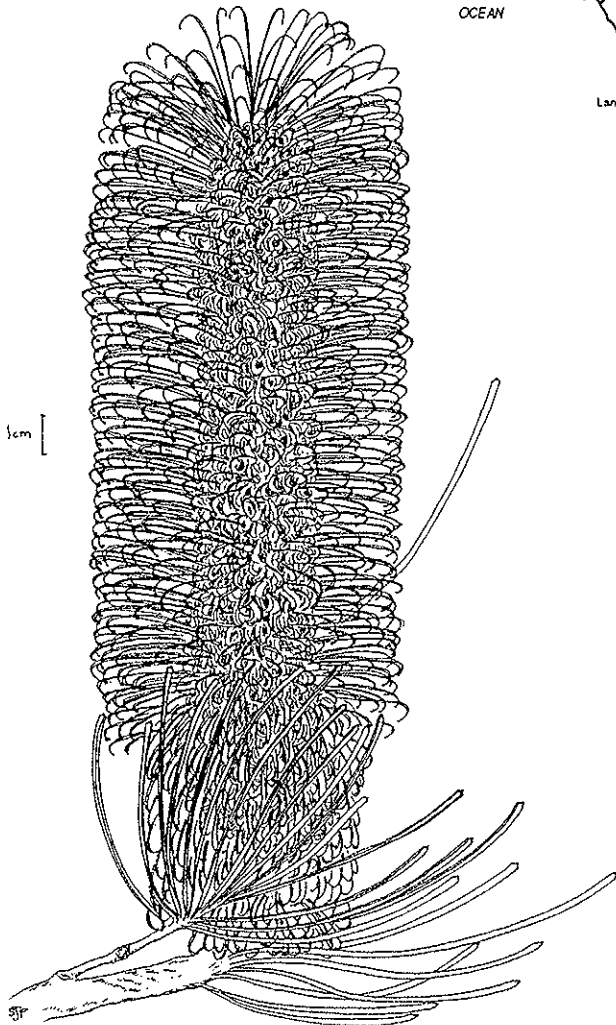
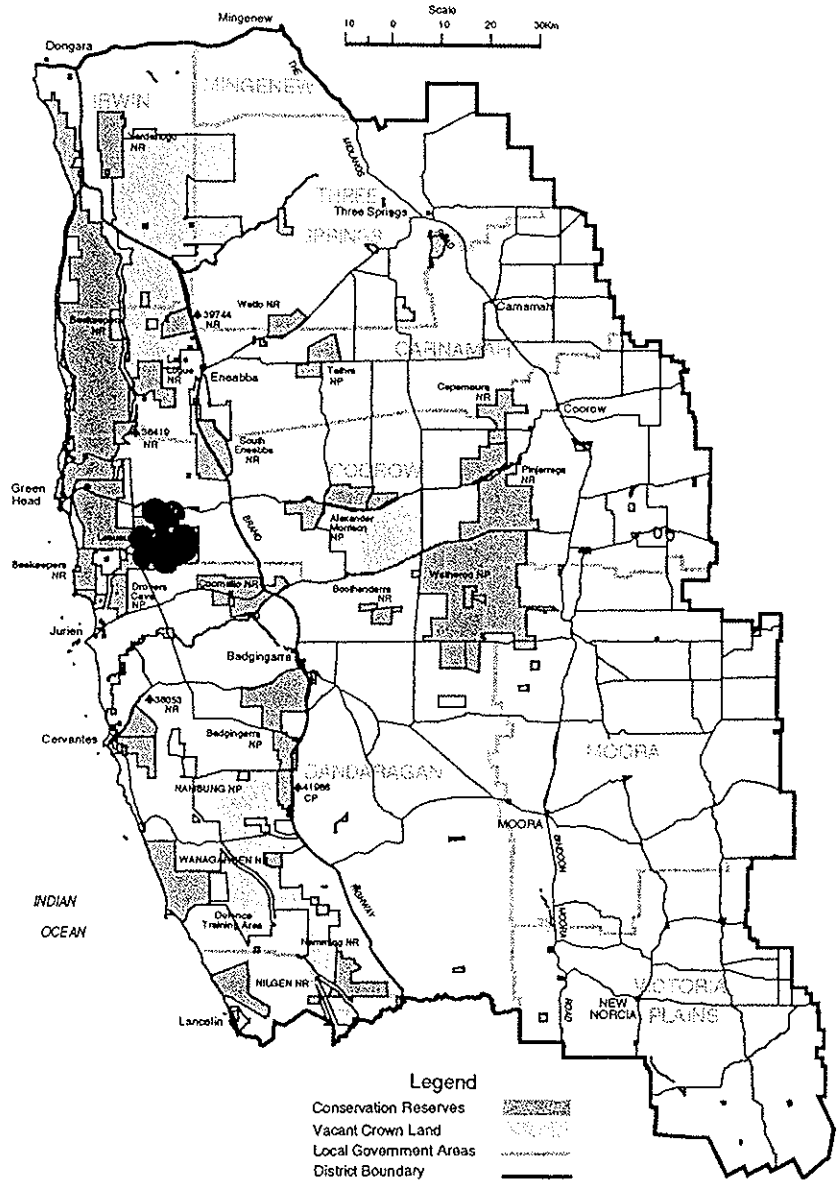
- Monitor populations regularly, particularly any recruitment since the fire in 1985.
- Exclude off-road vehicle access.
- Maintain liaison with landowners on whose property some of the populations occur.
- Fence populations 2, 4-6 and 11.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Protect, where possible, from inappropriate fire regime.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

#### Research Requirements

- Conduct research on the susceptibility of the species to *Phytophthora* species.

#### References

George (1981, 1984b), Holliday and Watton (1975), Lamont and van Leeuwen (1988), Lievense (1981), Rye and Hopper (1981), Taylor and Hopper (1988), van Leeuwen (1985).



● *Banksia tricuspis*

## *Calectasia arnoldii* Keighery ms

DASYPOGONACEAE

[*Calectasia* sp. Central Wheatbelt (K.Dixon 861)]

Stilted Tinsel Lily

An erect, perennial plant without underground rhizomes and forming clumps to ca. 10 cm in diameter. The upright branches or main stems are slender and woody, up to 60 cm long. There are numerous stilt roots, some projecting from the upper branches. The stilt roots are 1-3 mm thick and 1-15 cm long. The leaves are narrow, linear and slightly prickly, arranged spirally on the main stems and at the ends of short shoots. The flowers are similar to those of *Calectasia cyanea*, with six narrow perianth parts, but those of *C. arnoldii* ms are of a more intense blue colour. The six anthers change to red from yellow as they age.

This species is related to *C. grandiflora*, but differs in its erect growth, and in the presence of stilt roots.

**Flowering Period:** August-October

### **Distribution and Habitat in the Moora District**

Known in the Moora District from one population south-west of Coorow (population 7). This species has been reported to have been found ca. 6 km further north-east along the same road, in a population of the same size and on the same side of the road (population 2). This location has been searched several times without success and is possibly the same population as 7. Known elsewhere from seven other populations, five in the Narrogin District and two in the Katanning District. Of these, three are located on nature reserves, with a total of 145 plants, two on townsite reserves with 204 plants, one on a shire road reserve, of one plant, and one on a church site reserve of three plants.

The population near Coorow grows in pale yellow-grey sand in tall open scrub of *Actinostrobus* sp. over heath with species of *Verticordia*, *Eremaea*, *Leptospermum* and *Baeckea*.

### **Conservation Status**

Current: Declared Rare Flora

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
2. SW of Coorow	Co	Shire Road Reserve	7.8.1991	20	Healthy, but has not been found since
7. Capamauro	Co	Nature Reserve	10.1992	20	Undisturbed

### **Response to Disturbance**

Killed by fire, regenerating from seed. A population in the Narrogin District which was burnt produced 230 seedlings after the fire, with 123 remaining after two years.

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

Unknown

### **Management Requirements**

- The known population may require marking on the firebreak to prevent damage during maintenance.
- Monitor population at regular intervals.
- Protect from inappropriate fire regime where possible.

- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

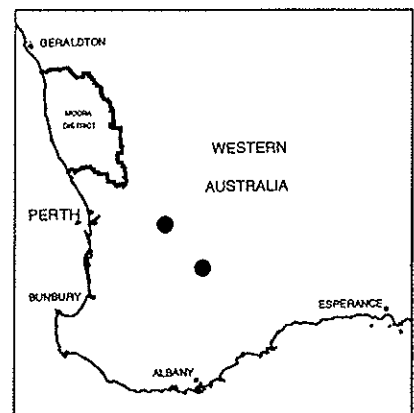
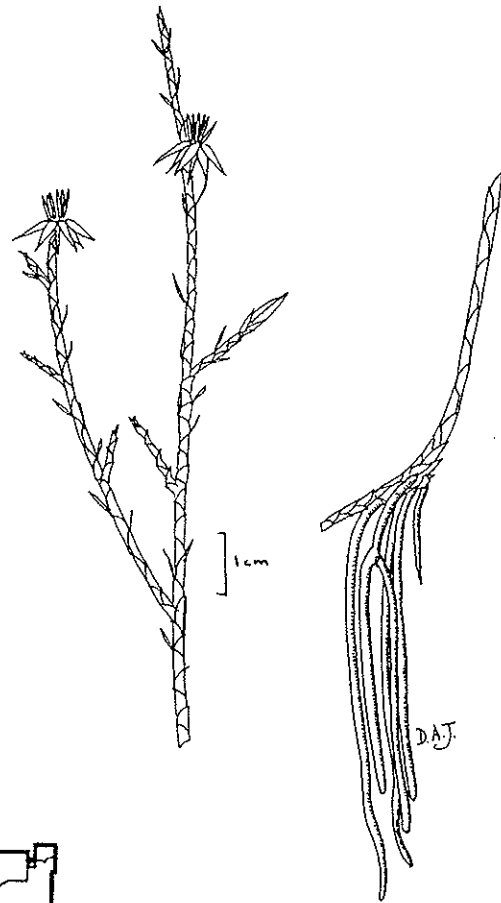
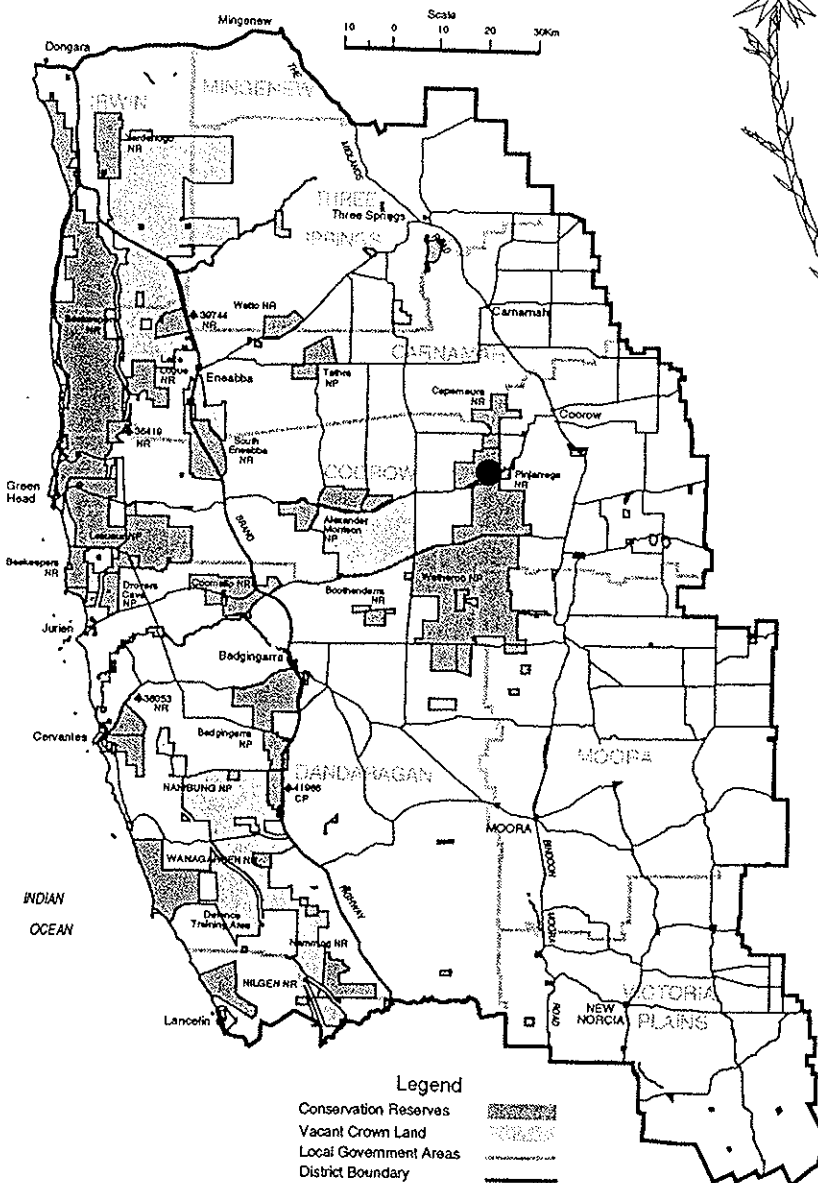
**Research Requirements**

- Further survey is required, particularly within the Nature Reserve where the habitat for this species appears to be common, and in areas which have been recently burnt.
- Research is required on the population biology and fire response of the species and its susceptibility to *Phytophthora* species.

**References**

Dixon (1991).

● *Calectasia arnoldii* ms



Locality Map

*Chamelaucium griffinii* N.G.Marchant & Keighery ms

MYRTACEAE

[*Chamelaucium* sp. Cataby (G.J.Keighery 11009)]

Griffin's Wax Flower

This species was discovered in 1988 by E. Griffin and is known only from one population. *Chamelaucium griffinii* ms is a much-branched, spreading shrub 30-50 cm tall with terete, obtuse leaves 7-10 mm long, with a reddish tinge. The flowers occur in leaf axils at the ends of the branches, on short stalks. Each flower has a narrow, 10-ribbed floral tube ca. 4 mm long and five fringed calyx lobes each ca. 1 mm long. The five petal lobes are broadly elliptic, a little longer than 1 mm, white in colour, ageing to red. There are 10 stamens alternating with 10 tapering staminodes. The style is ca. 6 mm long. This species is related to *C. ciliatum* as is *C. roycei* ms which it resembles but *C. griffinii* ms differs in the shape of its anthers, staminodes, petals and in characters of the leaf.

An Interim Recovery Plan has been written for this species by CALM and is currently being implemented.

**Flowering Period:** June-October

**Distribution and Habitat in the Moora District**

Known from one population of 30+ plants near Badgingarra which extends from a nature reserve onto private land. Despite intensive survey no other populations have been found. It occurs on the edges of a breakaway, to the slopes at the base, in brown loam, sandy clay and lateritic gravel between lateritic boulders. It grows in low heath, with associated species including *Melaleuca radula*, *Calothamnus quadrifidus* and *Dryandra* species and under open low woodland of marri.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SE of Cataby	D	Nature Reserve, Private	25.9.1991	30+	Good, firebreak runs through population

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

- The population should be protected from frequent fire, where possible, until the fire response of the species is known.
- Continued liaison with landowners and local government authority is essential to ensure the survival of the population.
- Monitor the population at regular intervals, particularly in relation to the nearby recently established lookout, walk trail and carpark.

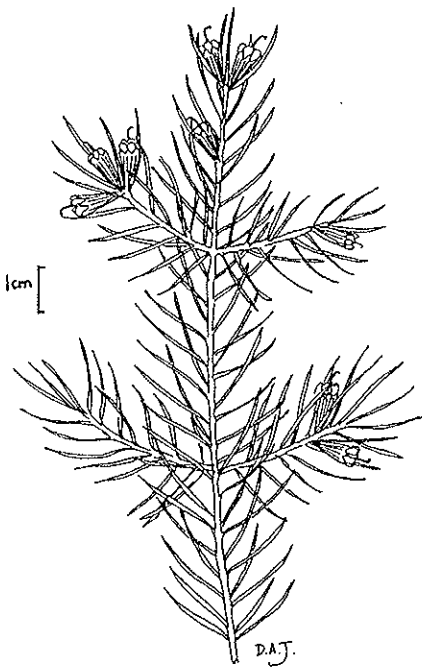
- Fence population if visitor pressure becomes deleterious.
- Investigate the possibility of acquisition of private land on which part of the population occurs, if the opportunity arises, as an addition to the nature reserve.
- Ensure that dieback hygiene procedures are carried out at population.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### Research Requirements

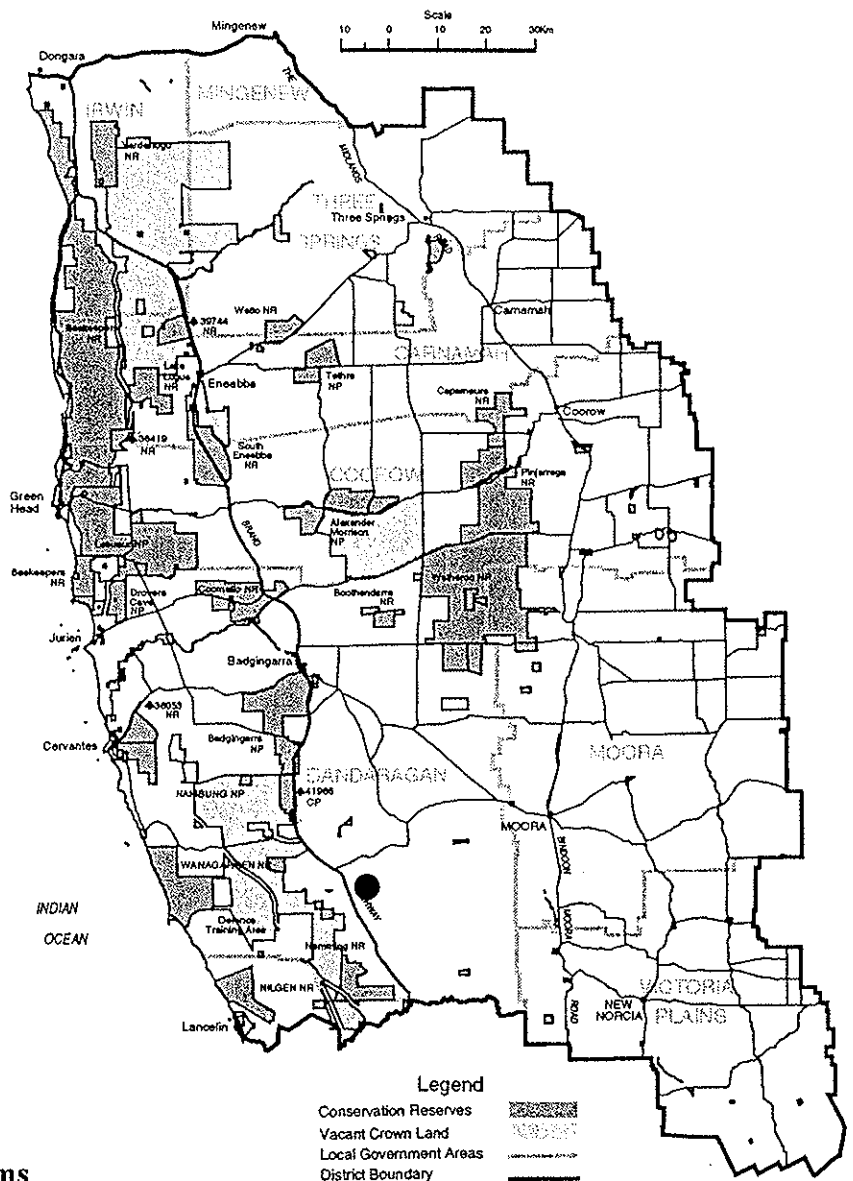
- Research is required into the fire ecology of the species.
- Continued survey work is required to discover more populations in the District.
- Conduct research on the susceptibility of the species to *Phytophthora* species.

### References

Hopper *et al.* (1990), N. Marchant (personal communication).



● *Chamelaucium griffinii* ms



## *Conostylis micrantha* Hopper

HAEMODORACEAE

Small-flowered Conostylis

A perennial herb forming tufts up to 30 cm in diameter. The leaves are terete, 31-24 cm long, with a few simple, spreading, white hairs on the lower margins, which are 3-9 mm long. The flowers are in bifurcate, flattened heads on stems 5-13 cm long with a hairy, papery bract 3-8 mm long, half way up. The perianth is 5-7.5 mm long, tubular in the lower half, dividing into six spreading lobes which are cream inside, golden yellow towards the base. The flowers are pale yellowish-cream ageing to brick red. The stamens are joined to the perianth at one level, the anthers are 1-1.7 mm long, slightly longer than the filaments. The style is 3-4 mm long.

This species is related to *Conostylis teretifolia*, but has longer leaf hairs, which are confined to the base of the leaf. It flowers earlier and has smaller flowers which are arranged in a bifurcate, flattened, many-flowered head, not in a few-flowered simple head.

**Flowering Period:** July-August

### **Distribution and Habitat in the Moora District**

This species is endemic to the northern part of the Moora District (extending into the Geraldton District) where it occurs over a range of ca. 15 km in an area north-east of Dongara. All but one of the populations are now in the Geraldton District.

*C. micrantha* grows in white or grey sand, usually high in the landscape in heath or low heath. Associated species include *Allocasuarina humilis*, *Eremaea* sp., *Hakea trifurcata*, *Hibbertia hypericoides* and *Dryandra fraseri*.

### **Conservation Status**

Current: Declared Rare Flora

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. W of Strawberry	I	Railway Reserve	7.8.1992	14	Weed infestation, disturbance, fire close to population

### **Response to Disturbance**

Unknown

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

Unknown

### **Management Requirements**

- Inspect population regularly.
- Some weed control is required.
- Maintain liaison with land managers.
- Ensure that dieback hygiene procedures are carried out at population.



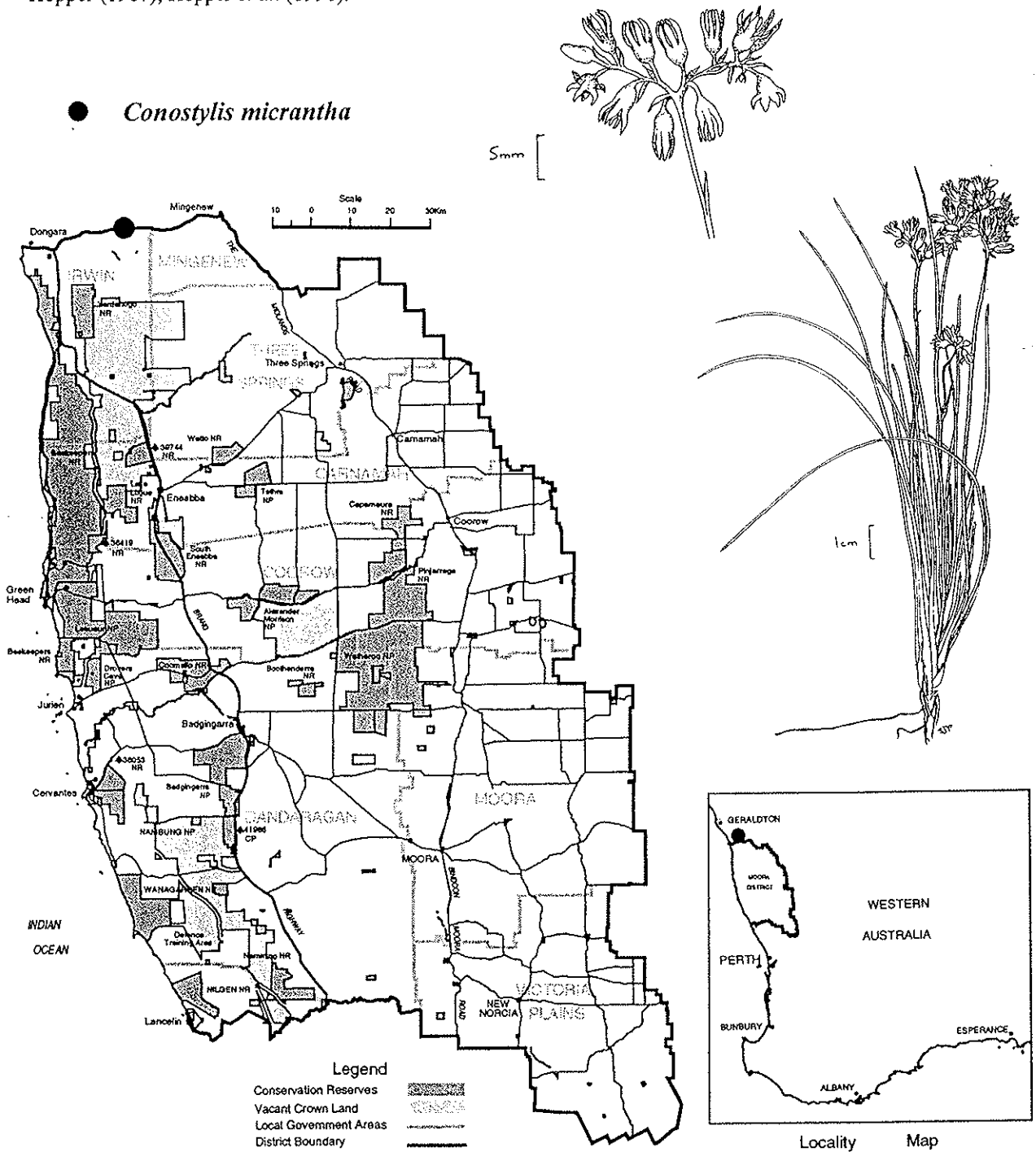
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### Research Requirements

- Further survey for new populations, particularly on reserves and uncleared land in the area.
- Consider establishment on a conservation reserve if no new populations are found.
- Conduct research on the fire response of the species and its susceptibility to *Phytophthora* species.

### References

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



## *Darwinia acerosa* W.Fitzg.

MYRTACEAE

### Fine-leaved Darwinia

*Darwinia acerosa* was first collected in the Mogumber area in November 1903 by W.V. Fitzgerald and named by him the following year. Further collections were made in 1934 and 1964 from the same area. Since that time the type population has been destroyed due to a combination of extensive clearing, and stock grazing of remnant vegetation.

*D. acerosa* is a densely branched, spreading, heath-like shrub to ca. 40 cm tall, characterised by its whitish branchlets and crowded, finely pointed, often hooked leaves to 1 cm long and ca. 1 cm wide. The flower heads that terminate the short branchlets are drooping, hemispherical, ca. 1.5 cm across, with 40-50 flowers surrounded by numerous spreading bracts. The bracts are longer than the flowers but do not hide them. The petals are yellowish-green. The styles are hairy below the stigma.

This species resembles *Darwinia masoni* and *D. purpurea* but is readily separated from both by the above characteristics.

**Flowering Period:** September-October

### Distribution and Habitat in the Moora District

Restricted to the Mogumber area, growing in rocky soil on and near granite outcrops. Known from three populations in the Moora District and four populations to the south in the Swan Region.

### Conservation Status

Current: Declared Rare Flora

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. S of Mogumber	VP	Private	16.8.1993	500+	Healthy
2. W of New Norcia	VP	Private	27.10.1982	1000+	Healthy
3. S of Gillingarra	VP	Rail & Shire Reserves	9.7.1991	4	Poor, area very weedy

### Response to Disturbance

- The plant resprouts from rootstock and stem shoots.
- Susceptibility to weed invasion is high, the weeds competing with the plants.
- Grazing impact is also high, one population (now extinct) was destroyed partially due to grazing of the plants and associated vegetation by stock.

### Susceptibility to *Phytophthora* Dieback

Unknown, but thought to be high.

### Management Requirements

- Ensure that dieback hygiene procedures are carried out at all populations.
- Continue close liaison with landowners/managers and local authorities.
- Monitor populations regularly to determine their conservation status.
- Control invasive weeds.

- Ensure that stock grazing is excluded from known populations.
- Protect from frequent fires, where possible, until more information is available on the fire response.
- Investigate the possibility of land acquisition.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

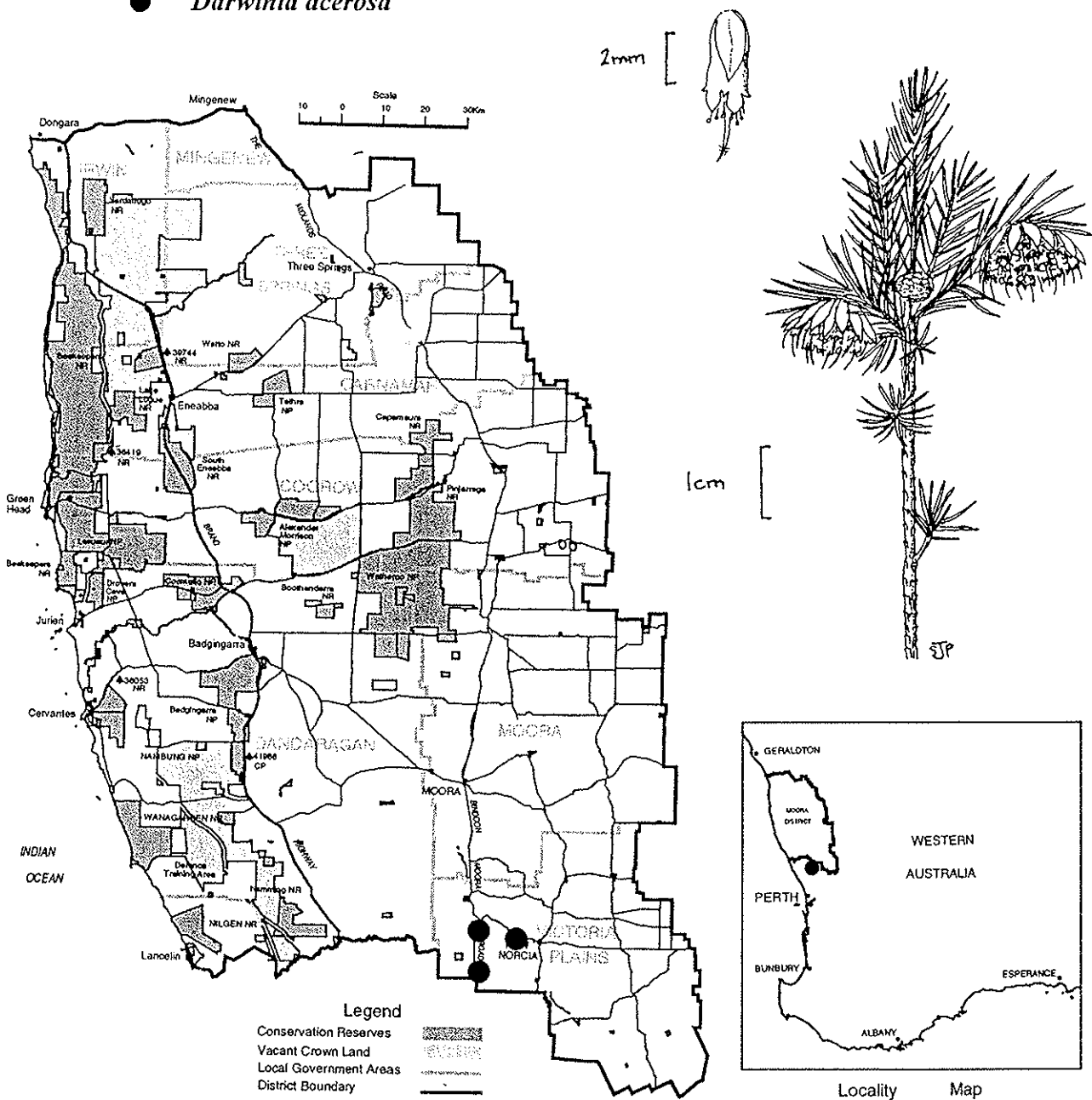
### Research Requirements

- Further surveys should be carried out in areas of suitable habitat.
- Resurvey population 2.
- Conduct research on the fire response of the species and its susceptibility to *Phytophthora* species.

### References

Fitzgerald (1904), Hopper *et al.* (1990), Rye and Hopper (1981).

### ● *Darwinia acerosa*



## *Darwinia carnea* C.A.Gardner

MYRTACEAE

### Mogumber Bell

*Darwinia carnea* was discovered by Charles Gardner, in 1922 in the Babilion Hills near Mogumber. It was last seen there in 1970 and was presumed extinct until 1990 when a population was discovered by E. Griffin not far from the original locality. Soon after this, a second population was found nearby by J. Gathe. A southern form, the Narrogin Bell, is considered to be a separate subspecies of *D. carnea*, and is known from a single population since its discovery in 1978 on private property near Narrogin.

*D. carnea* is a small shrub 20-30 cm tall. The leaves are opposite, linear lanceolate in shape and keeled, 6-10 mm long. The flower head is nodding and is surrounded by broad, ovate, coloured bracts which are yellowish-green to pinkish-red in colour, ca. 3 cm long and which conceal the flowers and their styles. There are ca. 8 flowers in each head. Each flower is tubular, with an unribbed calyx tube, and short, blunt lobes ca. 1.5 mm long. The five petals are white, 4 mm long. There are short staminodes between the ten stamens and the style is 13.5 mm long with a curved, bearded tip.

Plants found in the Babilion Hills area differ from plants in the Narrogin population which are taller, with a different habit, a larger inflorescence and there is a colour difference in the bracts.

**Flowering Period:** October-December

#### Distribution and Habitat in the Moora District

Known from two populations east of Mogumber. Grows on lateritic gravel and brown loam amongst massive laterite on breakaways in open low wandoo woodland over heath. Associated species include *Hibbertia hypericoides*, *Petrophile heterophylla*, *Adenanthos cygnorum* and *Dryandra nobilis*. The species also occurs in one population in the Narrogin District (population 1) on private property, where there are now 26 mature plants and 72 seedlings since removal of rabbits from the population. An attempt was made in 1985 to re-establish the species on private property in the Moora District in an area where it was thought to have occurred originally. None of the transplanted plants survived. There is also an unconfirmed report that the species was found WSW of Highbury in the Narrogin District but the location information was not precise and the population has not been refound.

#### Conservation Status

Current: Declared Rare Flora

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
3. SE of Mogumber	VP	Private	30.10.1994	200+	Undisturbed, damage to flower heads possibly by insects
5. ESE of Mogumber	VP	Private	30.10.1994	70	Population cleared, grazed and burnt ca. 5 years ago

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Unknown, but thought to be high.

## Management Requirements

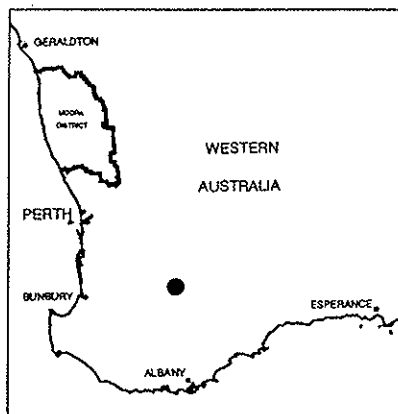
- Ensure that dieback hygiene procedures are carried out at all populations.
- Maintain liaison with property owners.
- Fence population 5 to prevent further damage from grazing.
- Monitor populations regularly.
- Investigate possibility of land acquisition.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

## Research Requirements

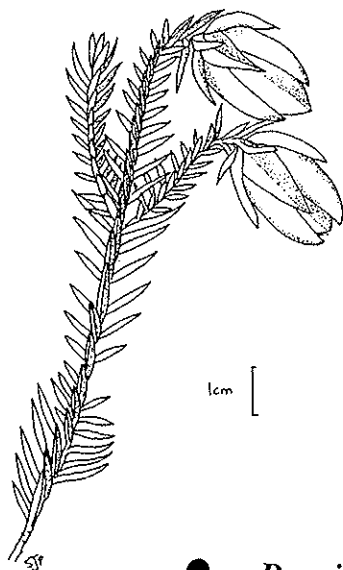
- Investigate cause of damage to flower heads at population 3.
- Continue electrophoretic research to determine the relationship between the Narrogin and Mogumber populations.
- Further survey in suitable habitat on remnant vegetation in the area.
- Consider establishment in suitable conservation area.
- Conduct research on the fire response of the species and its susceptibility to *Phytophthora* species.

## References

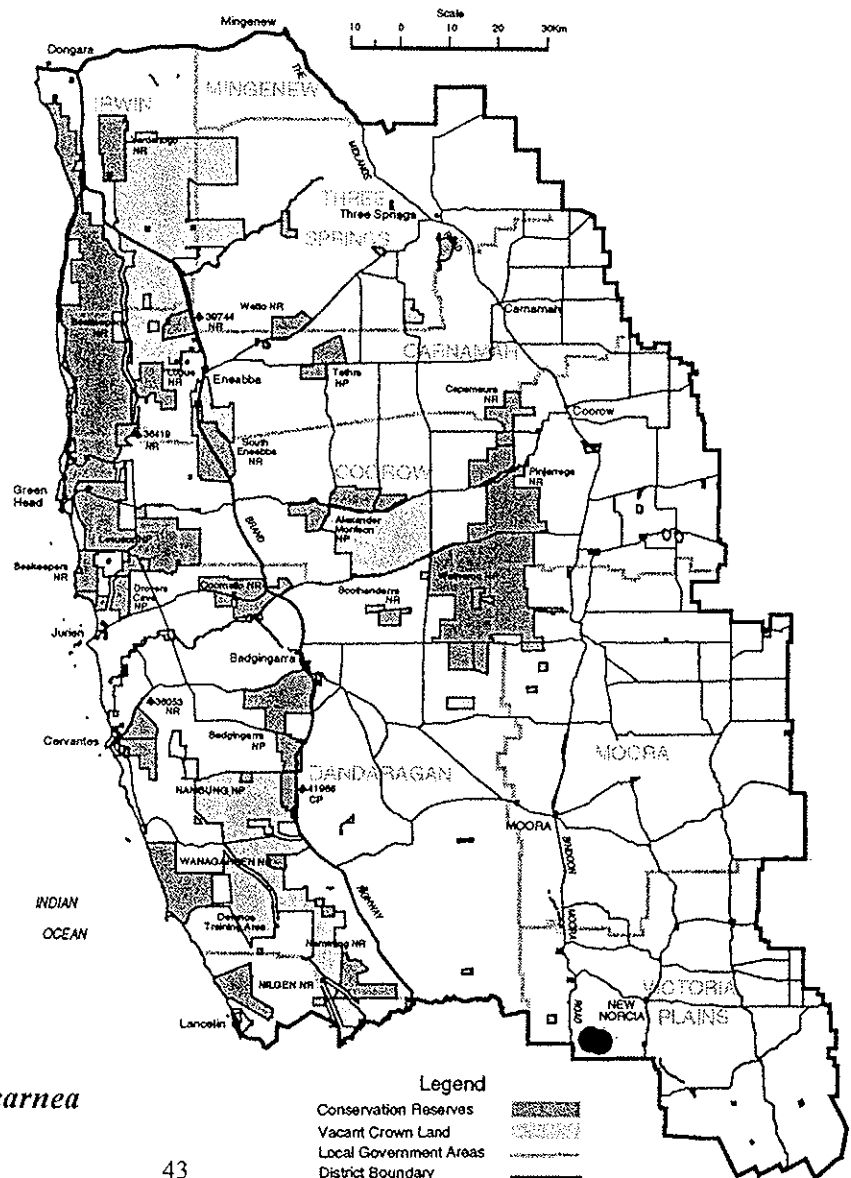
Blackall and Grieve (1980), Erickson *et al.* (1979), Gardner (1928), Millar (1982), Rye and Hopper (1981).



Locality Map



● *Darwinia carnea*



## *Daviesia bursarioides* Crisp

FABACEAE

[*Daviesia* sp. Three Springs (M.D.Crisp 6480)]

Three Springs *Daviesia*

This species was first collected in 1937 from the Irwin District. Survey by M. Crisp from 1975-1980 resulted in the discovery of only one population. However in 1993 two others were discovered by C. Straughan of the Three Springs Shire and a further two populations have been found more recently.

*Daviesia bursarioides* is a straggling, divaricately branching shrub to 2 m tall, with blue-green spine-tipped branches. The leaves are scattered, small, narrow and obovate in shape, narrowing to the base, to 20 mm x 2.5 mm. The flowers are grouped in 3-8 flowered racemes in the axils of the leaves, on a long stem to 35 mm, giving the raceme an open appearance. Each flower has an upper standard petal 7 x 9 mm, yellow in colour and maroon towards base. The wing petals are 6 x 3 mm, deep pink, the keel is 5 x 2 mm, maroon in colour. The fruit is a triangular pod, to 10 x 9 mm.

This species is distinctive and cannot be confused with other species of *Daviesia*. The regular, divaricate branching of the stems, with spiny tips and the small phyllodes give a superficial resemblance to a *Bursaria* species, hence the specific name. It is thought to be related to *Daviesia costata*, *D. longifolia* and *D. pedunculata*.

Due to its critically threatened status, an Interim Recovery Plan has been written for this species by CALM and is currently being implemented.

**Flowering Period:** July-September

### Distribution and Habitat in the Moora District

Known from five populations over a range of ca. 10 km in the Three Springs area. Occurs on lateritic gravel and brown sandy loam on south-west, south and east facing slopes near the crest of hills in remnant open mallee scrub and heath. Associated species include *Allocasuarina campestris*, *Dryandra*, *Hakea* and *Acacia* species. Four populations occur on very narrow road reserves, with weed infestation in some populations and cleared or grazed paddocks adjacent. Population 4 occurs on a disused gravel pit, extending into uncleared vegetation.

### Conservation Status

Current: Declared Rare Flora

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Three Springs	TS	Shire Road Reserve	9.8.1994	19	Road reserve narrow, plants shaded by other shrubs
2. NNE of Three Springs	TS	Shire Road Reserve	10.8.1994	11	Road reserve narrow and weed infested
3. NW of Three Springs	TS	MRWA Road Reserve	10.8.1994	17	Good, but road reserve very narrow, adjacent cleared paddock
4. W of Three Springs	TS	Private	3.1.1995	60+	Undisturbed
5. NW of Three Springs	TS	MRWA Road Reserve	24.10.1994	12	Narrow road reserve
1.* S of Arrino	TS	-	1.7.1993	-	-

### Response to Disturbance

Thought to be a disturbance opportunist. Four of the populations are on narrow road reserves with some plants growing close to the road edge and seedlings at population 5 appeared to have grown after road shoulder grading. Population 4 is located partly in a disused gravel pit.

### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

### Management Requirements

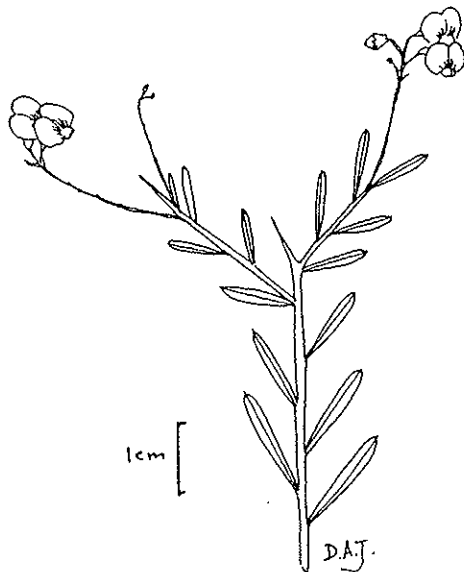
- Ensure that dieback hygiene procedures are carried out at all populations.
- Maintain liaison with landowners and land managers.
- Weed control is required at population 1 and needs to be assessed regularly at other populations.
- All populations should be inspected annually.
- Control of feral animals (rabbits) in all populations is required.
- Protect from frequent fire, where possible, until fire response has been investigated.
- Investigate the possibility of land acquisition.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### Research Requirements

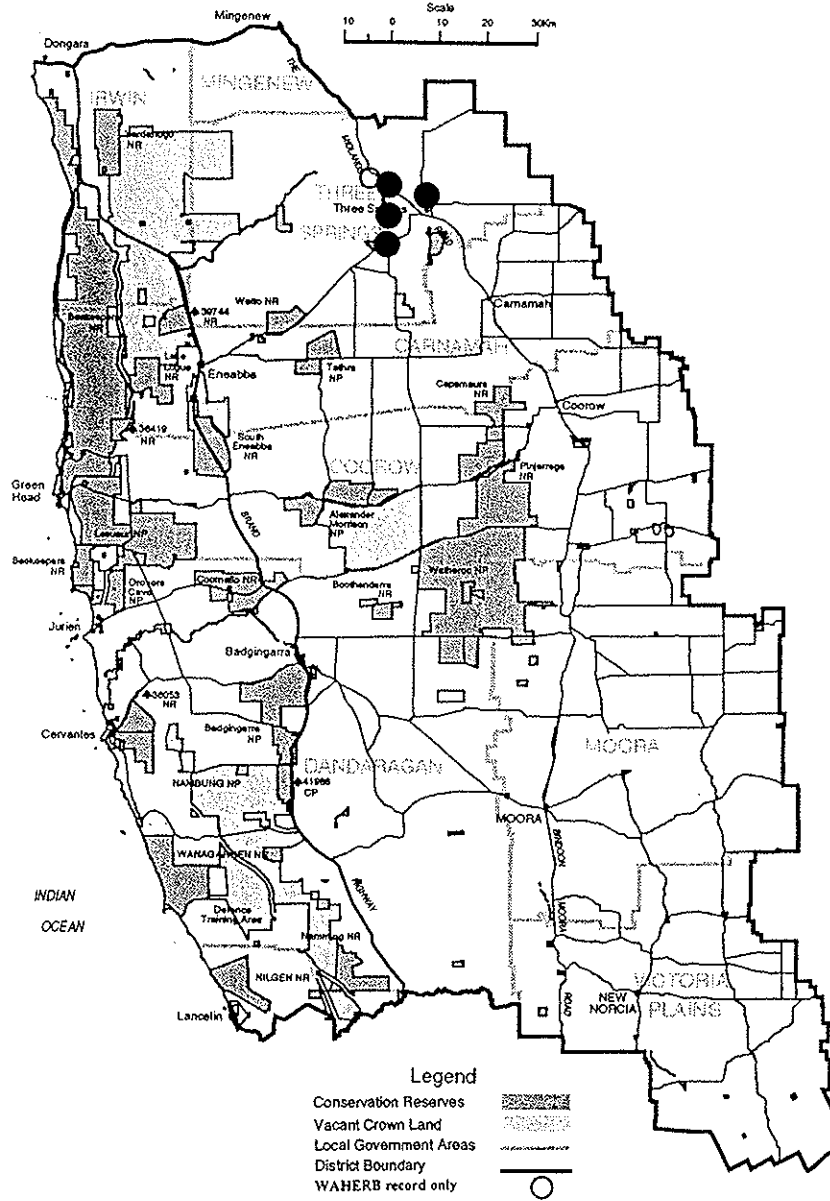
- Further survey on conservation reserves in the area for new populations.
- Conduct research on the fire response of the species and its susceptibility to *Phytophthora* species.

### References

Crisp (1985, 1995).



*Daviesia bursarioides*



● *Daviesia bursarioides*



## *Daviesia speciosa* Crisp

FABACEAE

Beautiful Daviesia

*Daviesia speciosa* was first collected by C.A. Gardner in 1958 from a single population near Mingenew (since cleared for agriculture). A further population was found by C. Chapman prior to 1969 who, after 20 years of study, noted that it flowered every year but did not produce seed. Further populations have been found north-east of Eneabba since that date.

*D. speciosa* is a glaucous, blue leafless shrub to 1 m high by 2 m wide with stiff, erect, prickly stems. It has a thick, spreading rootstock from which new plants are produced. The phyllodes are erect, continuous with the branchlets with small scale leaves at the base. The flowers are red and typically pea-shaped. They are large, to 2.5 cm long on a long stalk, growing in one or two-flowered clusters on the stems. They are nodding. Pods have not been seen and the plants apparently do not set seed.

**Flowering Period:** April-June

### **Distribution and Habitat in the Moora District**

*D. speciosa* is currently known from five populations over a range of ca. 40 km, all in the Moora District.

Occurs in dense low shrubland of species such as *Acacia*, *Grevillea*, *Eremaea*, *Hakea trifurcata*, *Hibbertia*, *Calothamnus longissimus* and *Allocasuarina* in lateritic loams, usually high in the landscape.

### **Conservation Status**

Current: Declared Rare Flora

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Garibaldi-Willis Road.	Ca	Tathra National Park, Shire Road Reserve	9.10.1991	385	Healthy, possible threat from road works and gravel extraction
2. N of Eneabba-Carnamah Road on Touche Road	Ca	Tathra National Park, Shire Road Reserve	7.1.1992	100+	Most healthy, some plants damaged from firebreak construction
3. Yandanooka Road E of Scott Road	Mi	Shire Road Reserve, Private	18.08.1993	10+	Healthy, possible threat from road works and gravel extraction
4. Scott Road N of Yandanooka Road	Mi	Private	18.8.1993	50+	Healthy, possible threat from gravel extraction
5. Yandanooka Road W of Scott Road	Mi	Shire Road Reserve	18.8.1993	50+	Healthy

### **Response to Disturbance**

Plants resprout from suckering rootstock. At population 2 many plants were observed to have died in undisturbed vegetation, whereas those in a gravel scrape were all healthy.

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

Presumed susceptible

## Management Requirements

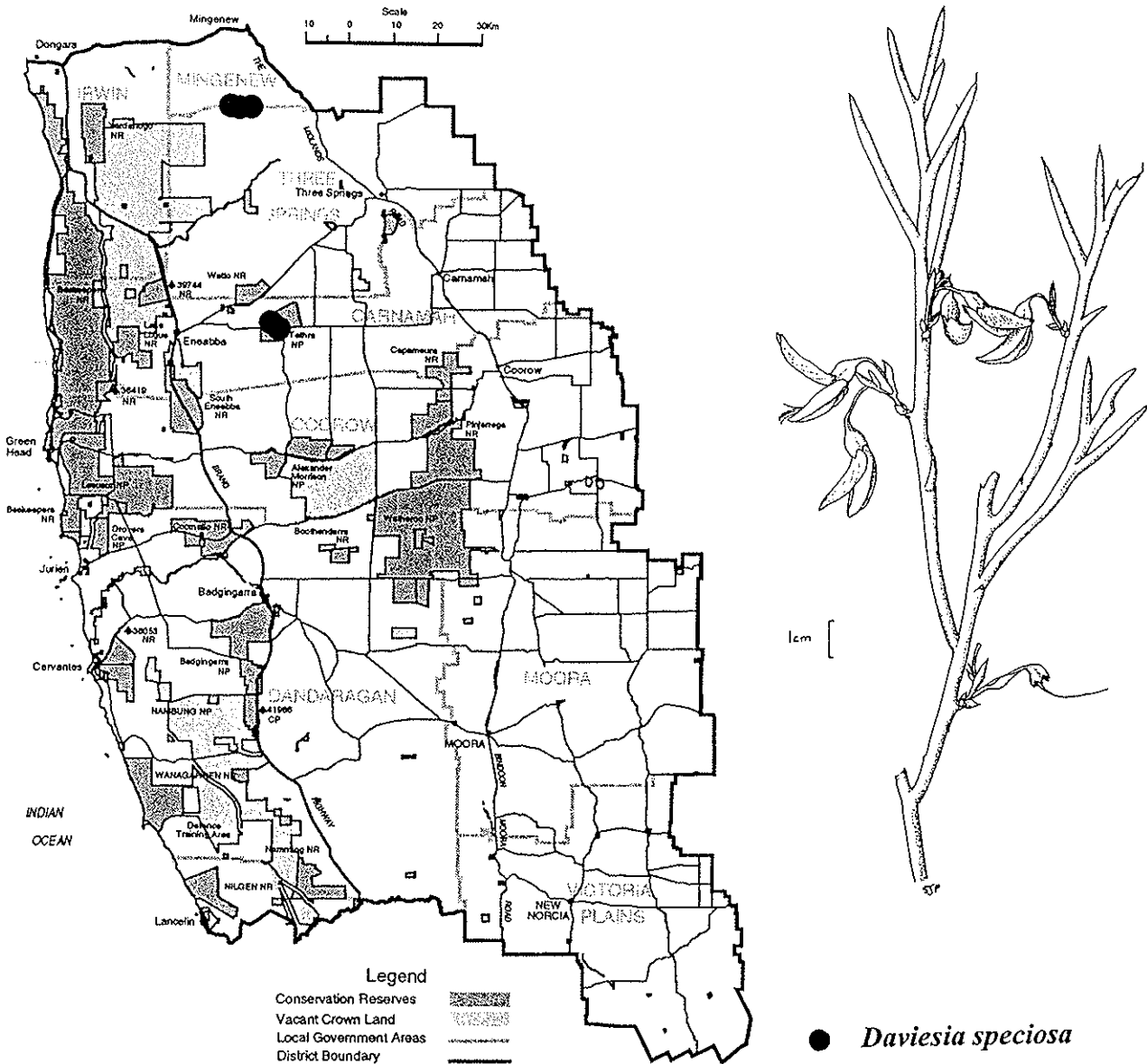
- Ensure that dieback hygiene procedures are carried out at all populations.
- Continue close liaison with landowners/managers and local authorities.
- Monitor populations regularly to determine their conservation status.
- Exclude areas where plants are known to occur from road works and gravel extraction.
- Collect germplasm material for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

## Research Requirements

- Research on the biology and ecology of this species has been carried out as part of a Masters degree project through the University of Western Australia.
- Further surveys should be carried out in areas of suitable habitat.
- Continue research on pollination biology and population ecology.
- Conduct research on the susceptibility to *Phytophthora* species.

## References

Crisp (1985, 1995), Hopper *et al.* (1990).



## *Drakaea elastica* Lindl.

ORCHIDACEAE

Glossy-leaved Hammer Orchid

*Drakaea elastica* was named by Lindley in 1840 from a collection made by James Drummond. Due to confusion over the type specimens it has more recently been known as *Drakaea jeanensis*. This name was given to it in 1920 by Rogers who was unaware of Lindley's description and, believing the species to be new, described it in honour of his wife. It was not until 1988 that the species was again correctly described as *D. elastica* by Jones, in his book *Native Orchids of Australia*. It differs from its closest relative *D. concolor* in its glossy, light green leaf, its somewhat hairier labellum head, its later flowering period and its southerly distribution between Catby and Ruabon.

**Flowering Period:** October-early November

### **Distribution and Habitat in the Moora District**

Known from a single population in the Moora District near Catby. Also known from 23 small populations in the Swan and Central Forest Regions, from Perth southwards to Ruabon on the Swan Coastal Plain. Occurs in deep sandy soil in banksia woodland, often in association with *Kunzea ericifolia*.

### **Conservation Status**

Current: Declared Rare Flora

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
21. E of Lake Guraga	D	Private	20.8.1993	7	Healthy

### **Response to Disturbance**

Unknown

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

Unknown, but thought to be low.

### **Management Requirements**

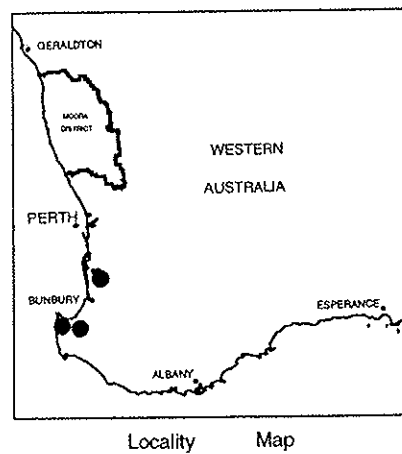
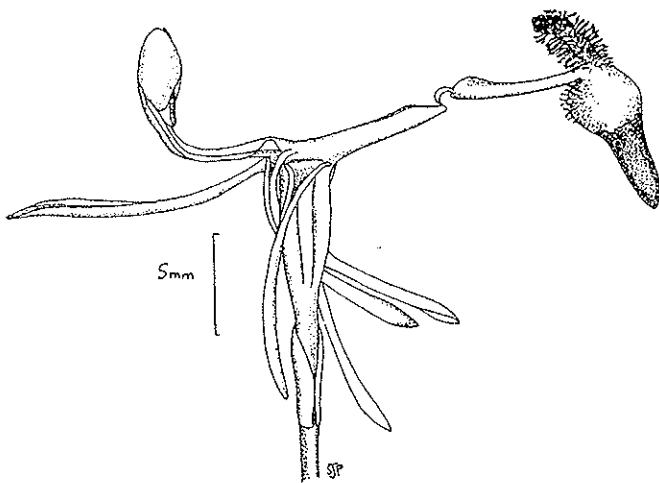
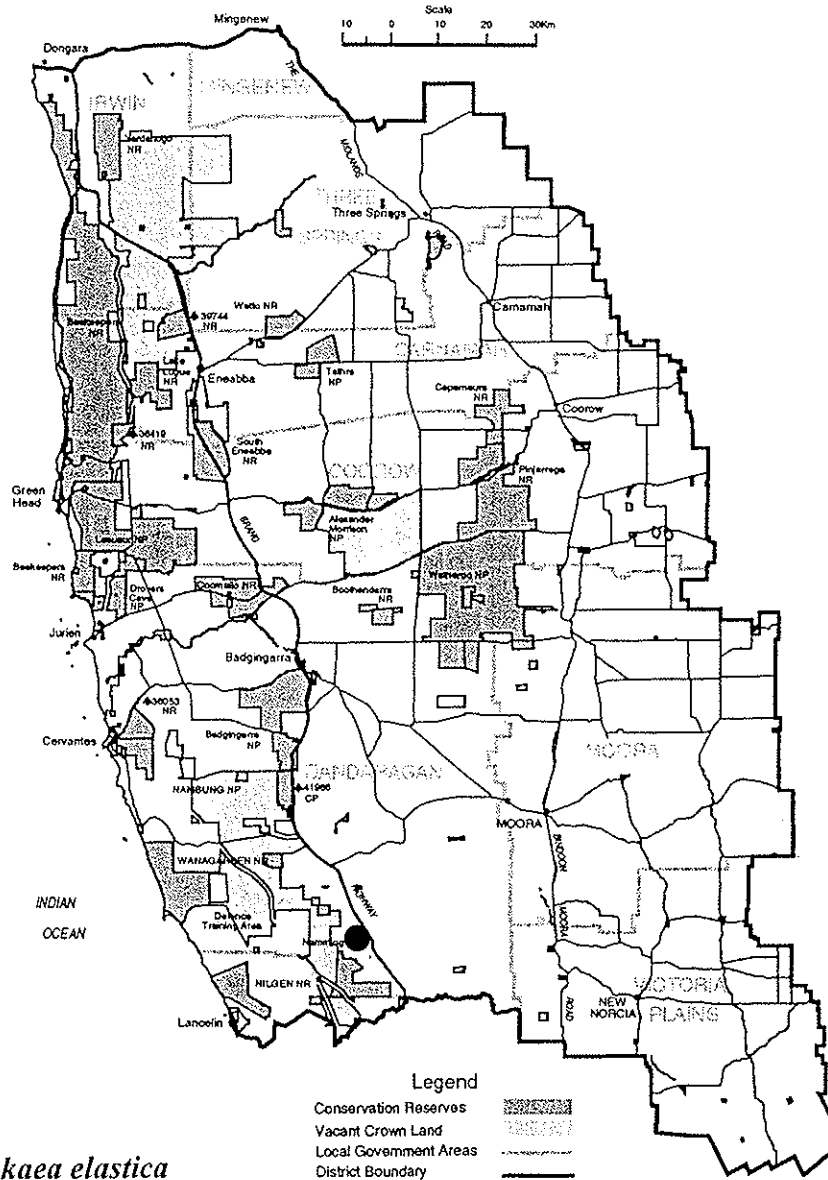
- Continue close liaison with landowners/managers and local authorities.
- Monitor populations regularly to determine their conservation status.
- Protect from fire, where possible, during vegetative/flowering phase.
- Ensure that dieback hygiene procedures are carried out at population.
- Collect germplasm for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### **Research Requirements**

- Further surveys should be carried out in areas of suitable habitat.
- Continue research on pollination biology and population ecology.

### **References**

Hoffman and Brown (1984, 1992), Hopper *et al.* (1990), Jones (1988), Lindley (1840), Rogers (1920).



*Drakonorchis drakeoides* Hopper & A.P.Brown ms

ORCHIDACEAE

Hinged Dragon Orchid

*Drakonorchis drakeoides* ms was first collected near Meckering by J. Tonkinson in the 1960s but, due to the loss of habitat in that area resulting from rising salinity, was not seen again until 1984 when R. Bates (an orchidologist visiting from South Australia) found a small population near Goomalling. Subsequent surveys located several more populations further north. All populations are small in size and much of their habitat is under threat through a combination of clearing, rising salinity and grazing by stock. *D. drakeoides* ms differs from other species in the genus in its small, hanging petals and sepals, its small, hinged labellum, 5-7 mm long with two lateral anterior slight swellings (not antenna-like as in *D. barbarossa* ms), its hump-like shoulder calli and its confinement to the margins of salt lakes. Rare hybrids of *D. drakeoides* ms x *Caladenia varians* subsp. *exilis* ms and *D. drakeoides* ms x *Caladenia longicauda* have been found and will be named X *Drakodenia ornata* and X *D. enigma* respectively. *D. drakeoides* ms is to be named after the genus *Drakaea*, alluding in particular to its loosely hinged tremulous labellum that is also a prominent feature of the hammer orchids.

Due to its critically threatened status, an Interim Recovery Plan has been written for this species by CALM and is currently being implemented.

**Flowering Period:** August-September

**Distribution and Habitat in the Moora District**

Known from five populations in the Moora District in the Watheroo area and a further eight populations in the Merredin District. Found on the elevated margins of salt lakes between Meckering and Lake Moore, growing in open seasonally wet sites beneath scrub including species such as *Melaleuca uncinata*, *M. cordata*, *Acacia acuminata* and *Exocarpos aphyllus*. Also known from a single small population on the margin of a low granite outcrop north of Beacon. Soils are usually dark brown sandy loams.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Masons Road	Co	Private	23.8.1988	10,000+	Healthy, but area weedy, heavily grazed and showing signs of salinity
2. Wubin-Gunyidi Road	Co	Private	11.9.1988	100+	Healthy
7. Miling West Road	Mo	Private	25.9.1992	1	Poor, area weedy and has been heavily grazed, population now fenced
11. Wubin-Gunyidi Road, W of population 2	Co	Private	20.9.1986	1000+	Healthy
12. Launer Road	Co	Nature Reserve	17.8.1993	30+	Poor, very weedy and showing signs of salinity

### **Response to Disturbance**

- Fire is thought to be detrimental if it occurs during the growing cycle of the plants.
- Susceptibility to weed invasion is high with most populations threatened by introduced weeds.
- Grazing impact is high with several populations known to have been severely depleted through grazing by domestic stock and rabbits.

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

Unknown, but thought to be low.

### **Management Requirements**

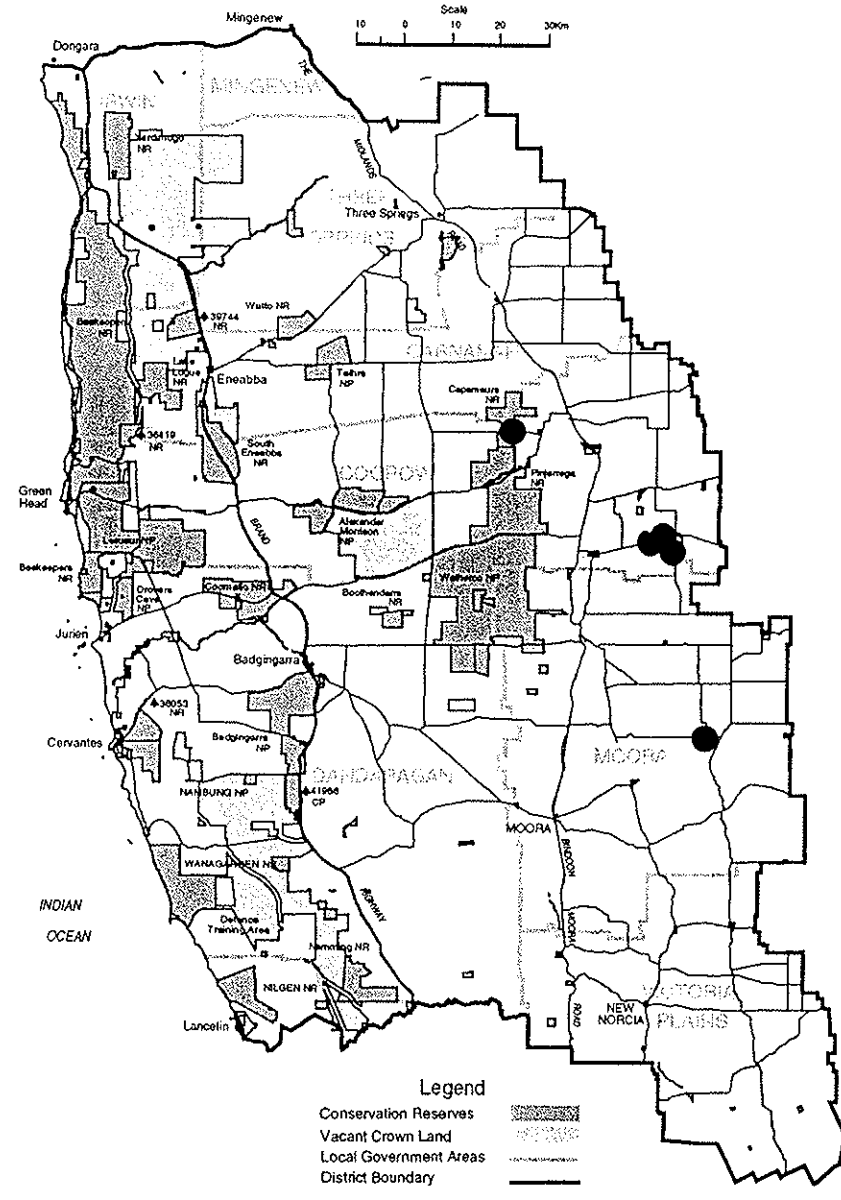
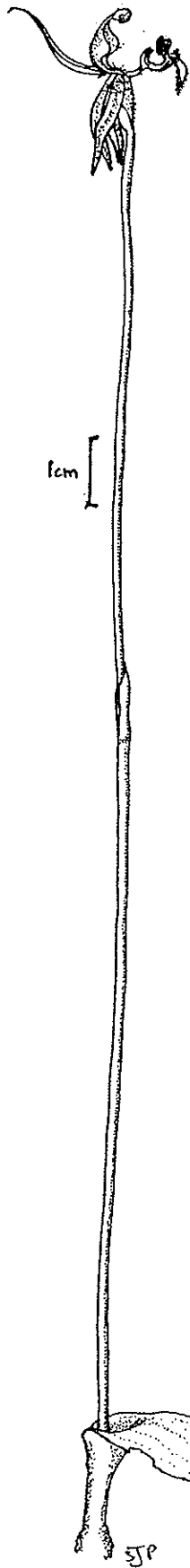
- Continue close liaison with landowners/managers and local authorities.
- Monitor populations regularly to determine their conservation status.
- Do not burn during vegetative/flowering phase of the plants (May-November).
- Control invasive weeds.
- Monitor rising salinity in some populations and if necessary provide management actions.
- Ensure that stock grazing is excluded from known populations.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect germplasm for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### **Research Requirements**

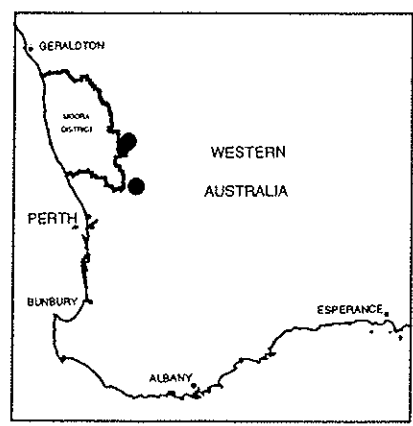
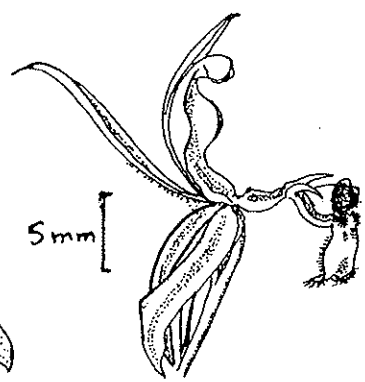
- Further surveys should be carried out in areas of suitable habitat north and south of Launer Road.
- Conduct research on pollination biology and population ecology.

### **References**

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



● *Drakonorchis drakeoides* ms



Locality Map

Summer Honey-pot

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

This species is similar to *D. nivea*, but has leaves with rounded rather than V-shaped sinuses. The floral arrangement is also different with *D. nivea* having pale brown flowers arising around the margin of the receptacle leaving a broad central cavity at anthesis, whereas in *D. mimica* the flowers are yellow, arise evenly and are evenly spaced from the receptacle. This arrangement is the same as for *D. vestita* which is the closest relative of *D. mimica*.

**Flowering Period:** December-January

#### Distribution and Habitat in the Moora District

Known from five populations in the Moora District, in an area west of Mogumber over ca. 10 km. The species grows in grey-white sand, on lower slopes in banksia open low woodland with a heath understorey. Associated species include *Banksia attenuata*, *Adenanthos cygnorum*, *Conospermum acerosum*, *Nemcia reticulatum* and *Dasyogon obliquifolius*. Outside the Moora District the species is known from two populations, one in the Swan Region and another in the Central Forest Region, north of Busselton.

#### Conservation Status

Current: Declared Rare Flora

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
2. W of Mogumber	VP	Private	28.4 1992	10	Poor, requires fencing
4. W of Mogumber	VP	Shire Road Reserve	28.9.1994	10	Undisturbed
5. W of Mogumber	VP	Shire Road Reserve	28.9.1994	100 est.	Undisturbed
6. W of Mogumber	VP	Private	21.3.1995	150+	Good, requires fencing
7. W of Mogumber	VP	Private	21.3.1995	60+	Good, requires fencing

#### Response to Disturbance

Population 2 has been heavily grazed and plants are showing signs of stress. However, this population appears to be higher in the landscape than most others which occur in fairly damp areas. Two other populations, which have had some grazing, appear to be vigorous.

#### Susceptibility to *Phytophthora* Dieback

Presumed susceptible



## Management Requirements

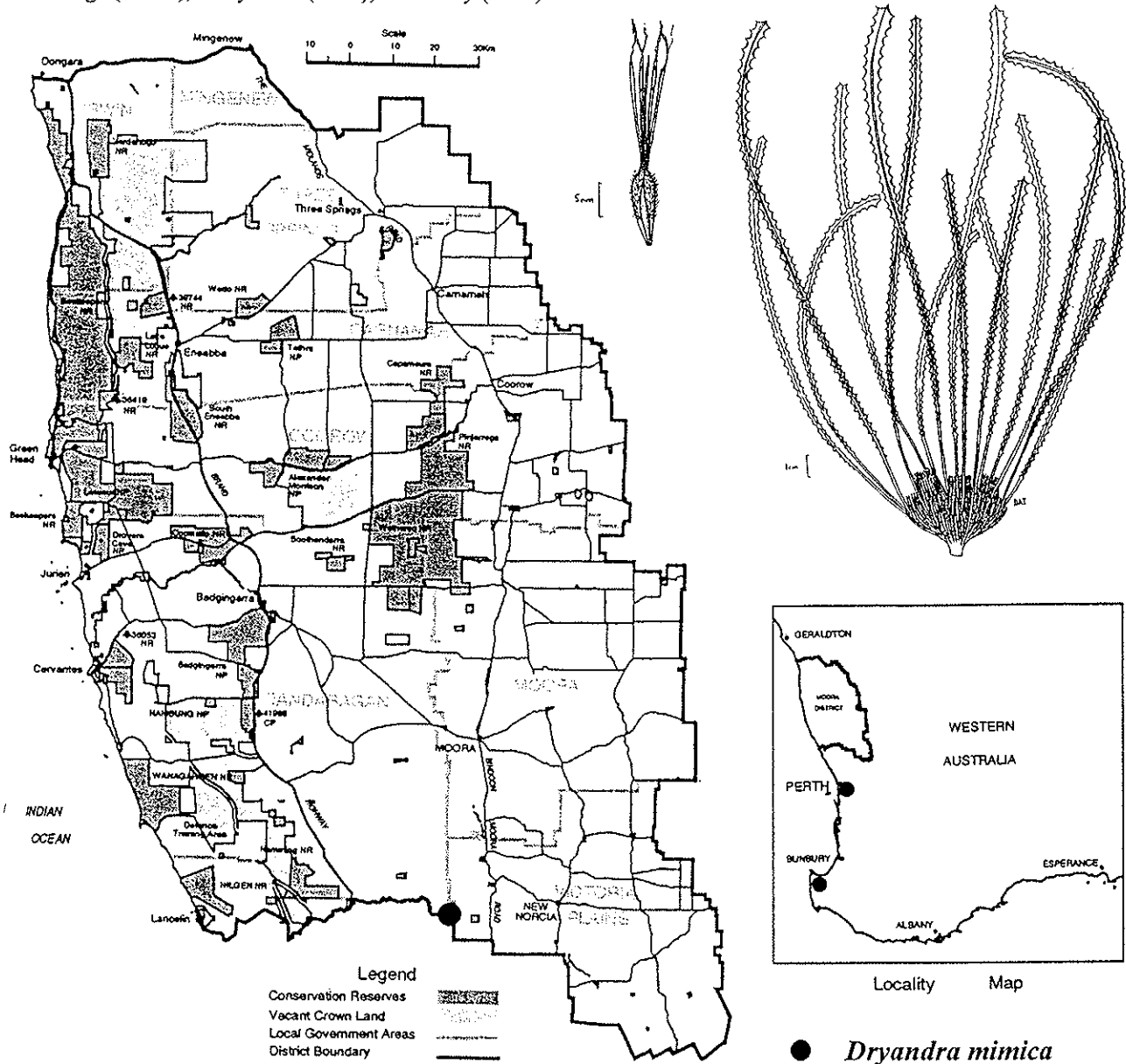
- Ensure that dieback hygiene procedures are carried out at all populations.
- Continue close liaison with landowners/managers and local authorities.
- Monitor populations regularly to determine their conservation status.
- Ensure that stock grazing is excluded from known populations.
- Fence populations 2, 6 and 7.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

## Research Requirements

- Further surveys should be carried out in areas of suitable habitat and populations 6 and 7 should be fully surveyed.
- Conduct research on pollination biology and population ecology.
- Conduct research on the fire response of the species and its susceptibility to *Phytophthora* species.

## References

George (1984c), Kelly *et al.* (1993), Sainsbury (1985).



*Dryandra serratuloides* Meisn. subsp. *perissa* A.S.George

PROTEACEAE

Northern Serrate Dryandra

*Dryandra serratuloides* has been recognised recently as consisting of three subspecies. *D. serratuloides* subsp. *meganotia* occurs from Gnowangerup to Jitarning in the Katanning and Narrogin Districts and was formerly known as *Dryandra* sp. 45. *D. serratuloides* subsp. *serratuloides* and subsp. *perissa* are endemic to the Moora District.

*D. serratuloides* is a low, compact shrub to 1 m tall and 1.2 m in diameter. The leaves are crowded on erect branches. They are 19 cm long, paler on the underside and they are divided almost to the midrib forming 20-33 linear lanceolate lobes on each side which are flat and quite rigid. The flowers heads are axillary, surrounded by lanceolate bracts which are hairless on the back and with white-woolly ciliate margins, which later become smooth. The flowers are yellow, ca. 2.5 cm long, with a silky hairy perianth and a longer, glabrous style which has a narrow, furrowed, darker coloured stigmatic end. *D. serratuloides* subsp. *perissa* has longer leaves with more lobes than the typical subspecies, and also has longer inflorescence bracts and a later flowering time.

**Flowering Period:** August-September

**Distribution and Habitat in the Moora District**

*D. serratuloides* subsp. *perissa* occurs ca. 80 km further north of the typical subspecies over a range of 20 km to the north of Badgingarra. The species grows in dense low heath sometimes in open low woodland of *Eucalyptus wandoo* or *E. drummondii* or mallee eucalypts in lateritic gravel and brown loam on ridge tops, slopes or in red-brown clayey sand on lower areas. Associated species include *Allocasuarina humilis* and *Dryandra* species.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
3. Boothendarra Hill	D	Nature Reserve	29.2.1992	200+	Undisturbed
4. N of Badgingarra	Co	National Park, Shire Road Reserve	7.11.1991	1500+	Part of population recently burnt
5. N of Badgingarra	Co	Shire Road Reserve, Private	14.8.1991	260+	Many plants dead

**Response to Disturbance**

Plants of the typical subspecies were observed to resprout from the base after the upper branches were killed by hot, dry conditions and seedlings germinated beneath the dead plants.

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.
- Monitor populations regularly, particularly those where a large proportion of plants have died, population 5.
- Maintain liaison with local government authorities on whose land the populations occur.
- Ensure that all road reserve populations are marked.

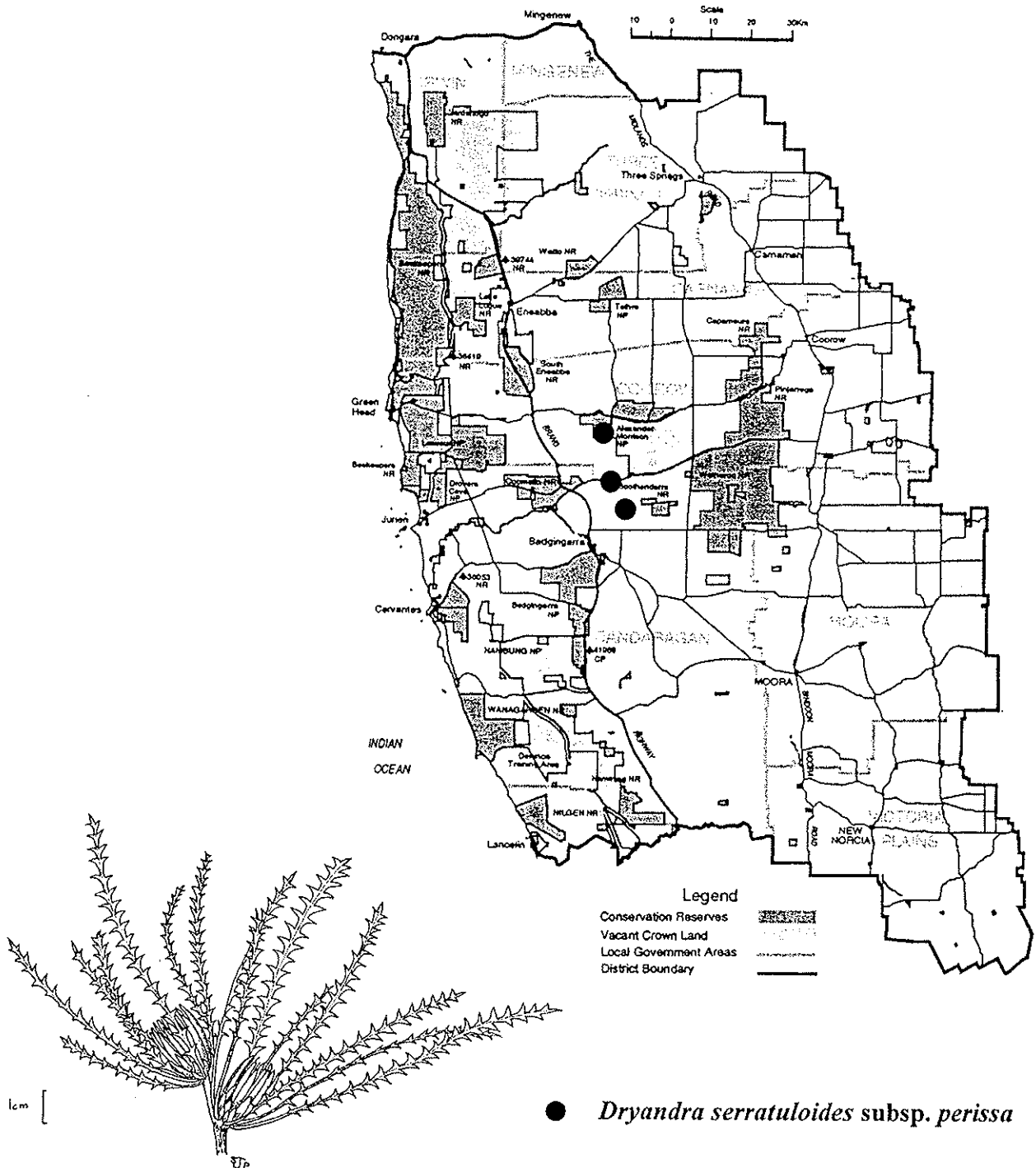
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Complete the collection of seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

**Research Requirements**

- Further survey is required, particularly in conservation areas.
- Conduct research on the fire response of the species and its susceptibility to *Phytophthora* species.

**References**

Bentham (1870), Blackall and Grieve (1988), George (1996), Griffin (1985), Sainsbury (1985).



*Dryandra serratuloides* Meisn. subsp. *serratuloides*

PROTEACEAE

Southern Serrate Dryandra

*D. serratuloides* subsp. *serratuloides* and subsp. *perissa* are endemic to the Moora District. *D. serratuloides* is a low, compact shrub to 1 m tall and 1.2 m in diameter. The leaves are crowded on erect branches. They are 5-8 cm long, paler on the underside and are divided almost to the midrib forming 6-12 linear lanceolate lobes on each side which are flat and quite rigid. The flowers heads are axillary, surrounded by lanceolate bracts which are hairless on the back and with white-woolly ciliate margins, which later become smooth. The flowers are yellow, ca. 2.5 cm long, with a silky hairy perianth and a longer, glabrous style which has a narrow, furrowed, darker coloured stigmatic end. *D. serratuloides* subsp. *serratuloides* has shorter leaves with fewer lobes than subsp. *perissa*, with shorter inflorescence bracts and an earlier flowering time.

**Flowering Period:** July-September

**Distribution and Habitat in the Moora District**

*D. serratuloides* subsp. *serratuloides* is found near the southern boundary of the Moora District where it occurs over a range of ca. 10 km in an area just north of Mogumber. The species grows in dense low heath, sometimes in open low woodland of *Eucalyptus wandoo* or *E. drummondii* or mallee eucalypts. It is found on lateritic gravel and brown loam on ridge tops or slopes or in red brown clayey sand on lower areas. Associated species include *Allocasuarina humilis* and *Dryandra* species.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Gillingarra	VP	Shire Road Reserve, Rail Reserve	4.9.1990	20+	-
2. N of Gillingarra	VP	Shire Road Reserve, Rail Reserve	25.7.1987	20+	-
6. S of Koojan	VP	Rail Reserve	27.6.1991	10	Undisturbed
7. S of Koojan	VP	Nature Reserve	27.6.1991	100+	Many plants dead ?, drought
8. S of Gillingarra	VP	Shire Road Reserve, Rail Reserve	9.7.1991	30+ & 12 dead	Partly disturbed
9. Gillingarra	VP	Nature Reserve, Shire Road Reserve, Rail Reserve, Private	28.4.1992	1100+	Plants on the N side of nature reserve heat affected, however most recovering, numerous seedlings, weedy
10. S of Gillingarra	VP	Shire Road Reserve, Rail Reserve	9.7.1991	30+	-

**Response to Disturbance**

Some exposed plants at population 9 were killed by a hot, dry cyclonic wind in August 1991. Others, which had apparently died, were resprouting from the base in April 1992 and seedlings have germinated beneath several dead plants.

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

## Management Requirements

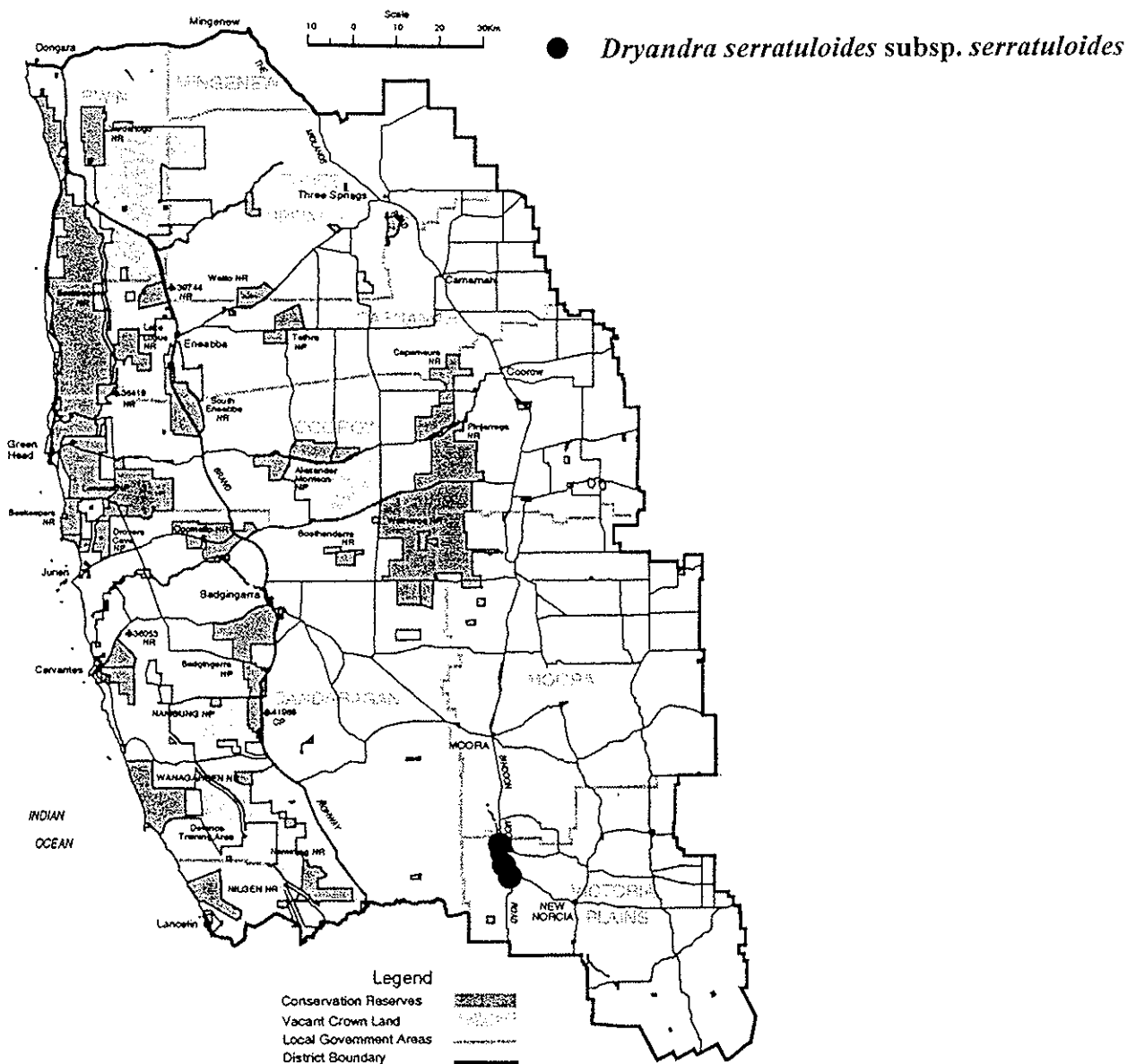
- Ensure that dieback hygiene procedures are carried out at all populations.
- Monitor populations regularly, particularly populations 7 and 8 where a large proportion of plants have died.
- Maintain liaison with landowners and land managers of land on which the populations occur.
- Investigate the possibility of land acquisition at population 9 to enhance the conservation status of this subspecies.
- Weed control at population 9.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Complete the collection of seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

## Research Requirements

- Monitor growth of seedlings and resprouting plants at population 9.
- Further survey is required.
- Conduct research on the fire response of the species and its susceptibility to *Phytophthora* species.

## References

Bentham (1870), Blackall and Grieve (1988), George (1996), Griffin (1985), Sainsbury (1985).



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

MYOPORACEAE

Heath-like Eremophila

This species was first collected and described last century from specimens collected at Port Gregory in the Geraldton District and has more recently been found near Kalbarri. The population near Eneabba was found in 1948 by Charles Gardner.

*Eremophila microtheca* is an erect heath-like shrub to ca. 1 m high, with stems and leaves finely hairy, becoming glabrous. The plant has a strong, pungent scent. The leaves are crowded and linear, ca. 1 cm long. The flowers are lilac in colour, tubular with five lobes. The populations in the Kalbarri area differ from those in the Moora District, which have longer, terete leaves.

**Flowering Period:** August-September

**Distribution and Habitat in the Moora District**

This species is known in the Moora District from one area south-west of Eneabba where it occurs for ca. 2 km along a drainage line. It has also been found near Kalbarri in the Geraldton District, where two populations are known.

It grows on sandy clay soils in winter wet areas, in open low woodland of *Casuarina obesa*, with tall scrub of *Melaleuca raphiophylla*, and other *Melaleuca* species.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

---

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Eneabba	Ca	Nature Reserve, Shire Road Reserve	2.9.1993	65	Healthy
3. SW of Eneabba	Ca	Private	6.1.1992	1000+	Plants grazed, remnant vegetation in pasture

---

**Response to Disturbance**

Plants at population 2 were surviving as the only representative of native vegetation in grazed pasture. The plants were partly grazed but some were in flower. Grazing is possibly inhibited to some extent by the strong smell and presumably the taste of the plant.

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

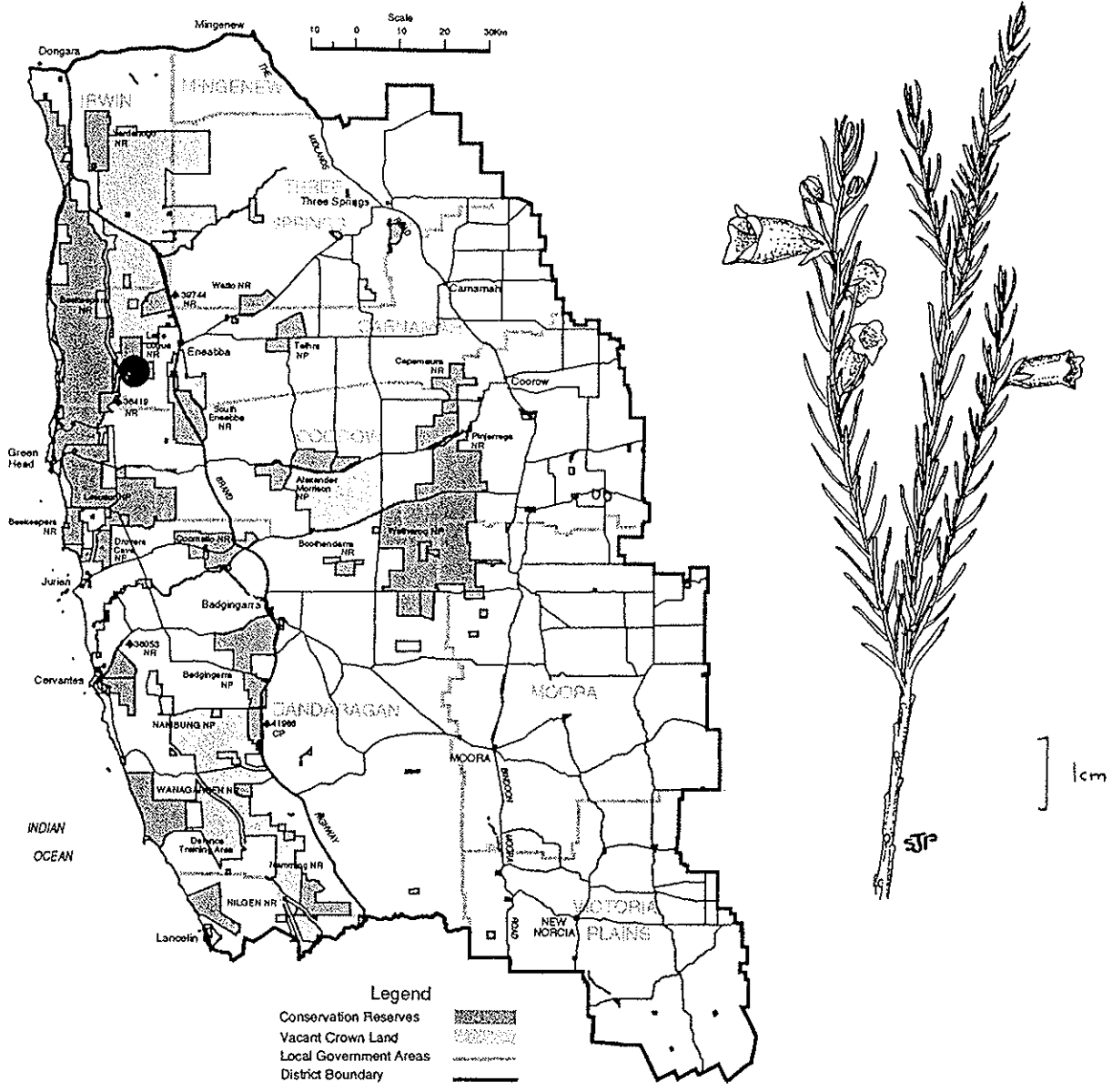
- Maintain liaison with landowner and local government authority.
- Fence population 3.
- Weed control at population 3.
- Monitor populations regularly.
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further taxonomic research may be required to clarify differences between the northern and southern populations.
- Further survey is required to find new populations.
- Conduct research on the susceptibility of this species to *Phytophthora* species.

**References**

Bentham (1870), R. Chinnock (personal communication), Patrick and Hopper (1982).



● *Eremophila microtheca*

## *Eremophila nivea* Chinnock

## MYOPORACEAE

### Silky Eremophila

An erect, compact shrub to 2 m tall, with branches, leaves, pedicels and sepals clothed in a dense covering of whitish, woolly hairs. The leaves are sessile, alternate and linear, to 18 x 3.5 mm, acute, with slightly turned back margins. The flowers are borne 1-2 in the axils of the leaves, on pedicels 2-5.5 mm long. The sepals are acute, to 11 x 2.5 mm. The petal tube is about 23 mm long, tubular, two-lipped, hairless on the outside and lilac in colour. It is whitish inside on the lower lip, with lilac to brown spots. There are four stamens, which are held within the flower tube. The fruit is ovoid in shape, beaked, with a papery, buff-coloured coat, splitting at the apex. This species is similar to *Eremophila eriocalyx*, but differs in the more dense tomentum, the hairless corolla, open corolla throat, shorter pedicels and sepals. *E. nivea* has been cultivated mainly by enthusiasts under the name *E. margarethae*.

This species is one of several endangered *Eremophila* species for which the population dynamics and seed biology have been studied as part of a Ph.D. thesis at Curtin University. It is also the subject of an Interim Recovery Plan being written by CALM.

**Flowering Period:** August-October

### Distribution and Habitat in the Moora District

The species is known from six populations which occur over a range of less than 5 km to the north of Three Springs. All but one are on narrow, weed infested road reserves in a heavily cleared area of the northern wheatbelt. The largest population is on uncleared, fenced private land and is in good condition apart from some weed infestation. Although much of the area is cleared there may be further populations on private land in suitable habitat. There is also a collection made from 40 km to the south-east of the present known occurrence but this was made over 30 years ago and the species has not been refound in that area. It has also been found to the north-east in the Geraldton District.

*E. nivea* grows in red-brown sandy loam and lateritic gravel, or in clayey loam, usually near the edge of seasonal creeks, in open York gum woodland and open scrub. Associated species include *Acacia acuminata*, *Eremophila glabra*, *Enchylaena tomentosa*, *Melaleuca*, *Maireana* and *Ptilotus* species.

### Conservation Status

Current: Declared Rare Flora

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Dudawa Road	TS	Shire Road Reserve, Private	11.6.1993	1 & 28	Weed infested, three mature, 26 seedlings
2. Campbell Road	TS	Shire Road Reserve	11.6.1993	20	Weed infested
3. Three Springs- Morawa Road	TS	Shire Road Reserve	11.6.1993	86	Weeds, nearby rubbish dumping, proposed road widening
4. Simpson Road	TS	Shire Road Reserve	11.6.1993	1	Plant damaged
5. S of Simpson Road	TS	Private	18.8.1993	285	Plants healthy, some weed infestation
6.* Ca. 30 km E of Three Springs	-	-	23.8.1960	-	-



### **Response to Disturbance**

The species has been reported to be a disturbance opportunist and the seed is thought to germinate in disturbed sites, possibly following fire. An experimental burn has been conducted at one population which should provide further information on the response of the species to fire. All populations have some weed infestation and those on road reserves are surviving with some recruitment. Thought to be short-lived, surviving in low numbers once associated vegetation has reached maturity.

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

Unknown

### **Management Requirements**

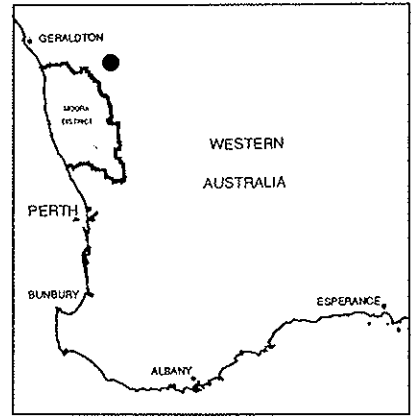
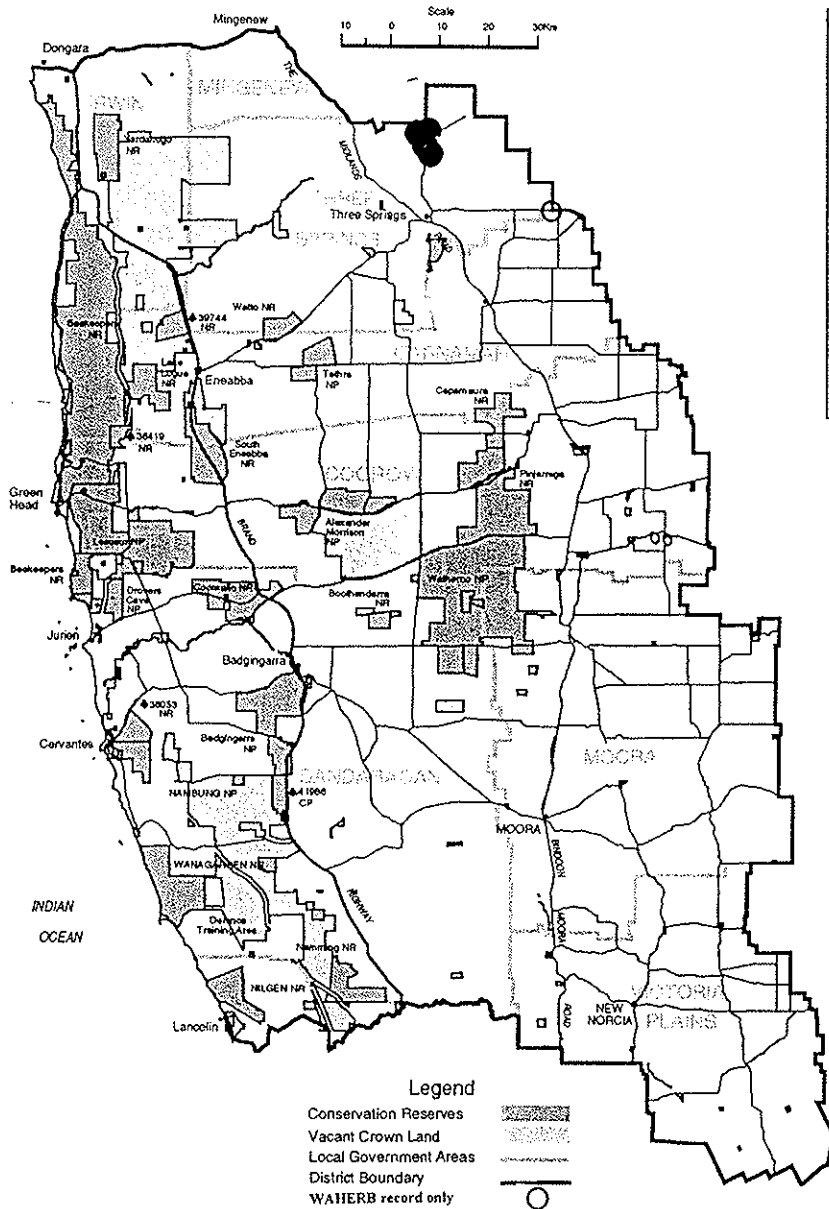
- Rehabilitation of associated vegetation and weed control is required for population 5.
- Weed control also required for severely degraded road reserve populations.
- Monitor all populations regularly.
- Ensure that markers are in place at all road reserve populations.
- Maintain liaison with land owners and managers of land on which the populations occur.
- Protect from fire, where possible, until fire response is known.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### **Research Requirements**

- Further survey is required in the area between the present known populations and the earlier occurrence 30 km east of Three Springs.
- Monitor the effect of road widening at population 3.
- Continue research on population biology and fire response and susceptibility to *Phytophthora* species.

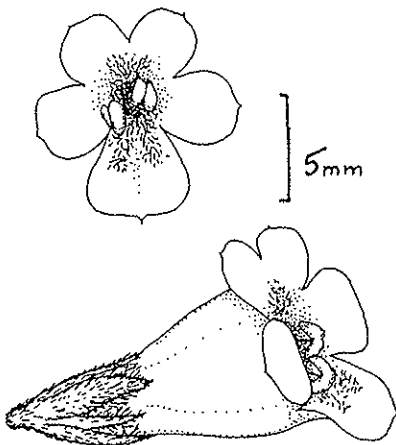
### **References**

Chinnock (1985), Elliot and Jones (1984), Papenfus *et al.* (1996), G. Richmond (personal communication).



Locality Map

● *Eremophila nivea*



*Eucalyptus absita* P.M.Grayling & Brooker

MYRTACEAE

[*Eucalyptus* sp. Badgingarra (M.I.H.Brooker 9026)]

Badgingarra Box

A mallee to 4 m tall, smooth-stemmed or rough-barked at the base, with fibrous grey-brown to yellowish bark for up to 2 m. Above this the bark is smooth grey over coppery or greenish bark beneath. The seedling leaves are opposite, dull, glaucous, and ovate to deltoid in shape. The adult leaves are glossy, with a dense vein network and are apparently glandless. The inflorescence is apparently terminal, the shoot apex growing out after flowering. It is 7-flowered. The buds are club-shaped to 5 mm long, the operculum hemispherical in shape. The stamens are bent inwards, with an inner ring of fertile stamens and an outer ring of staminodes without anthers, which are longer than the fertile inner stamens. The fruits are obconical to cup-shaped, with a thin rim and the disc inward sloping, enclosing the four valves, which have fused tips and are shed as a lid. The seeds are dark grey-brown, compressed ovoid in shape.

The most northerly population consists of mallees to 2 m which differ from the type population in their smooth bark, and features of the leaves including the presence of oil glands. This population produces few flowers and no viable seeds have been collected. It is considered that this population is closely related to *Eucalyptus absita* and may consist of a single clonal individual. Further studies are being conducted. *E. absita* has an affinity to *E. cuprea*, from which it differs in the glaucous juvenile leaves, the thin-rimmed fruit with an inward sloping disc and the winter flowering period. *E. loxophleba* sometimes occurs with this species and at some populations hybrids are present.

**Flowering Period:** April-July

**Distribution and Habitat in the Moora District**

Occurs in the Badgingarra area over a 15 km range. Grows as an emergent mallee in dense heath on white sand with lateritic gravel or clayey sand on sandy flats. Associated species include *Eucalyptus loxophleba*, *E. rudis*, *E. wandoo*, *Allocasuarina humilis* and species of *Calothamnus*, *Melaleuca*, *Hakea*, *Acacia* and *Petrophile*. The most northerly population occurs on the floodplain of the Hill River on dark grey sandy loam.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. NW of Badgingarra	D	Nature Reserve	29.9.1991	4	Undisturbed
2. SE of Old Badgingarra	D	Shire Road Reserve	1.5.1991	1	Undisturbed since 1986 when plant at road edge was damaged by road works
3. SE of Old Badgingarra	D	Private	27.12.1990	20 est.	Area grazed, requires fencing
4. S of Dunearn (Koonah) Road	D	Private	3.7.1992	1	Area grazed and requires fencing, road verge partly disturbed

### **Response to Disturbance**

Bulldozed plants produced lignotuberous resprouts at population 2.

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

Presumed not susceptible

### **Management Requirements**

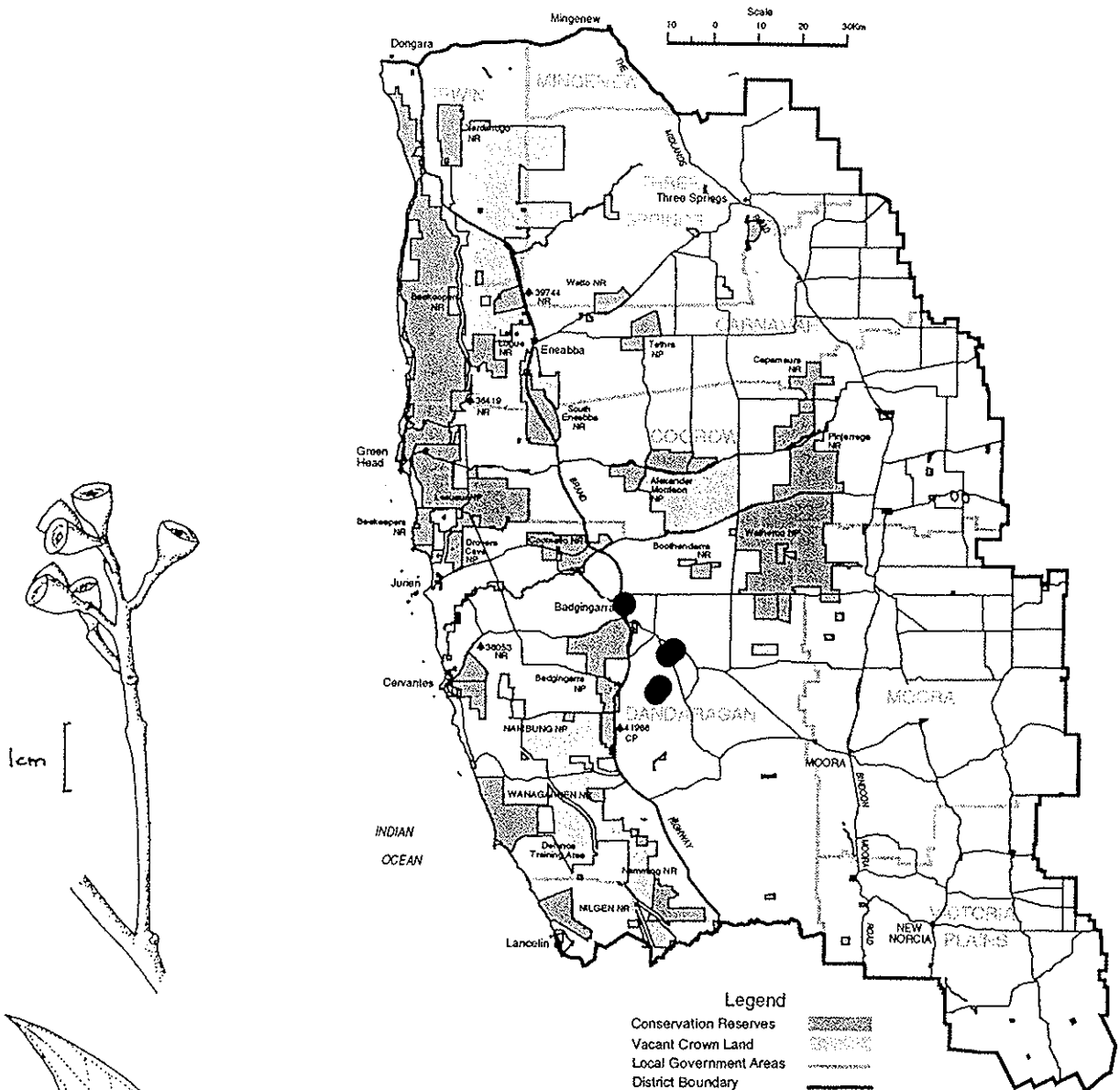
- Ensure that populations on private land are fenced.
- Monitor populations regularly.
- Maintain liaison with landowners and land managers.
- Ensure that markers are in place at population 2.
- Protect from fire, where possible, until fire response is known.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### **Research Requirements**

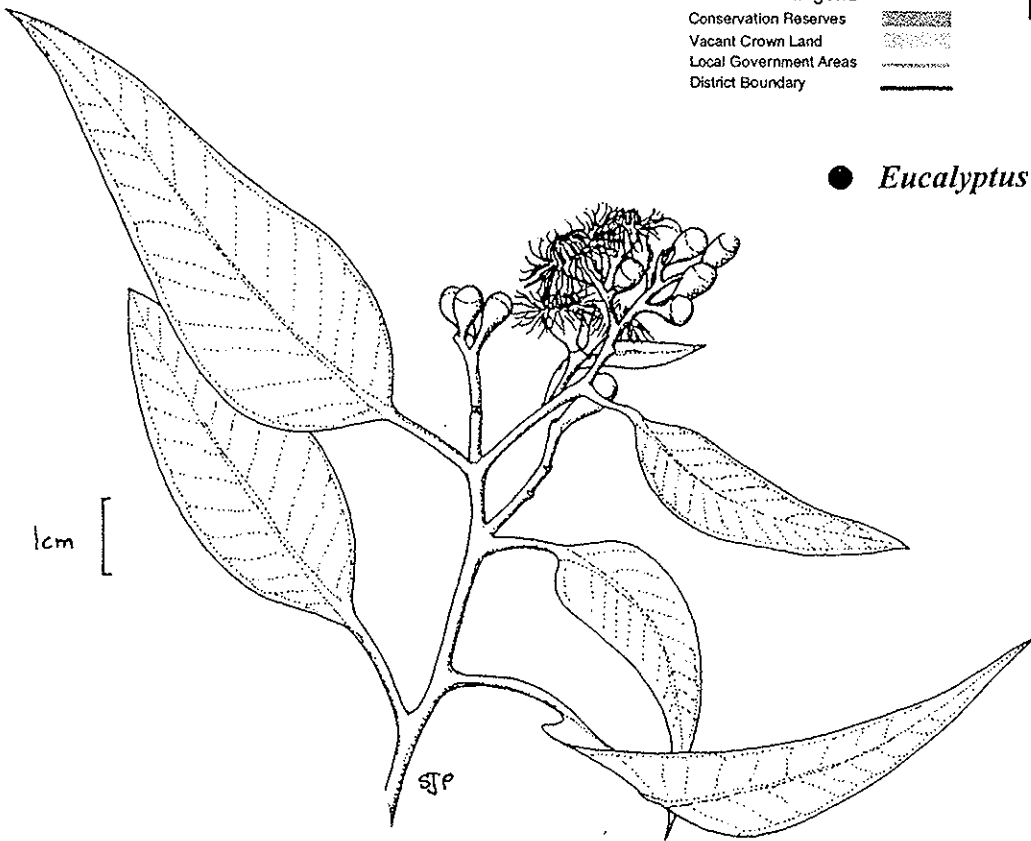
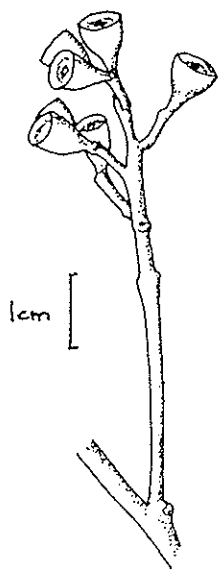
- Further survey particularly in reserves to the north of Badgingarra.
- Further investigation is required on the relationships between populations.
- Conduct research on the fire response of the species.

### **References**

Brooker and Kleinig (1990), Grayling (1989), Grayling and Brooker (1992), Kelly *et al.* (1995), Napier *et al.* (1988a).



● *Eucalyptus absita*



*Eucalyptus argutifolia* P.M.Grayling & Brooker

MYRTACEAE

[*Eucalyptus* sp. Yanchep (M.I.H.Brooker 8608)]

Yanchep Mallee, Wabbling Hill Mallee

A mallee to 3 m in height, with smooth grey and pale coppery bark. The leaves are thick and glossy, ovate to broad lanceolate in shape. The buds are sessile or shortly pedicellate in 7-11 flowered inflorescences. Each bud is ovoid to cylindrical, to 1.2 x 0.6 cm, with a hemispherical cap. The fruits have stout peduncles and are cup-shaped to cylindrical, often with ribs extending onto the pedicel. The seed is shiny, ruby-red to red-brown in colour. This species is closely related to *Eucalyptus obtusiflora* which has narrower, dull leaves and buds and fruits with distinct stalks.

**Flowering Period:** March-April

**Distribution and Habitat in the Moora District**

This species is known from fifteen populations between Wanneroo and Guilderton in the Swan Region. Two populations from near Seabird and the Hill River (the latter in the Moora District), resemble *E. argutifolia* in some characteristics but are probably more closely related to *E. obtusiflora*. Populations south of the District grow in shallow sand on limestone ridges and slopes, the mallees growing emergent from heath and thicket with *Dryandra sessilis* and *Melaleuca huegelii*. Population 4 grows on limestone in a small gully close to a river, on a cliff amongst low shrubs with *Grevillea thelemanniana*, *Hardenbergia comptoniana*, *Melaleuca huegelii* and *Acacia* sp.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
4. Hill River	D	Nature Reserve	10.4.1992	2	Area undisturbed

**Response to Disturbance**

The species regenerates by lignotuberous growth after fire. The Hill River population had been burnt 3-4 years previous to the inspection and was producing its first buds since the fire.

**Susceptibility to *Phytophthora* Dieback**

Presumed not susceptible.

**Management Requirements**

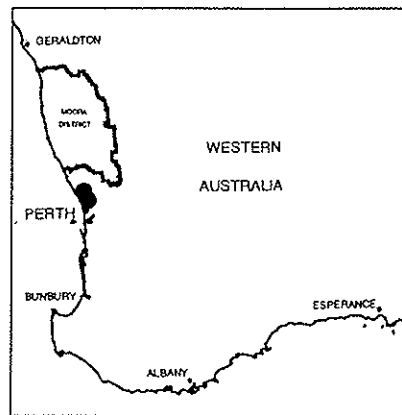
- Monitor the population regularly.
- Implement appropriate fire management.
- Ensure that dieback hygiene procedures are carried out at population.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

## Research Requirements

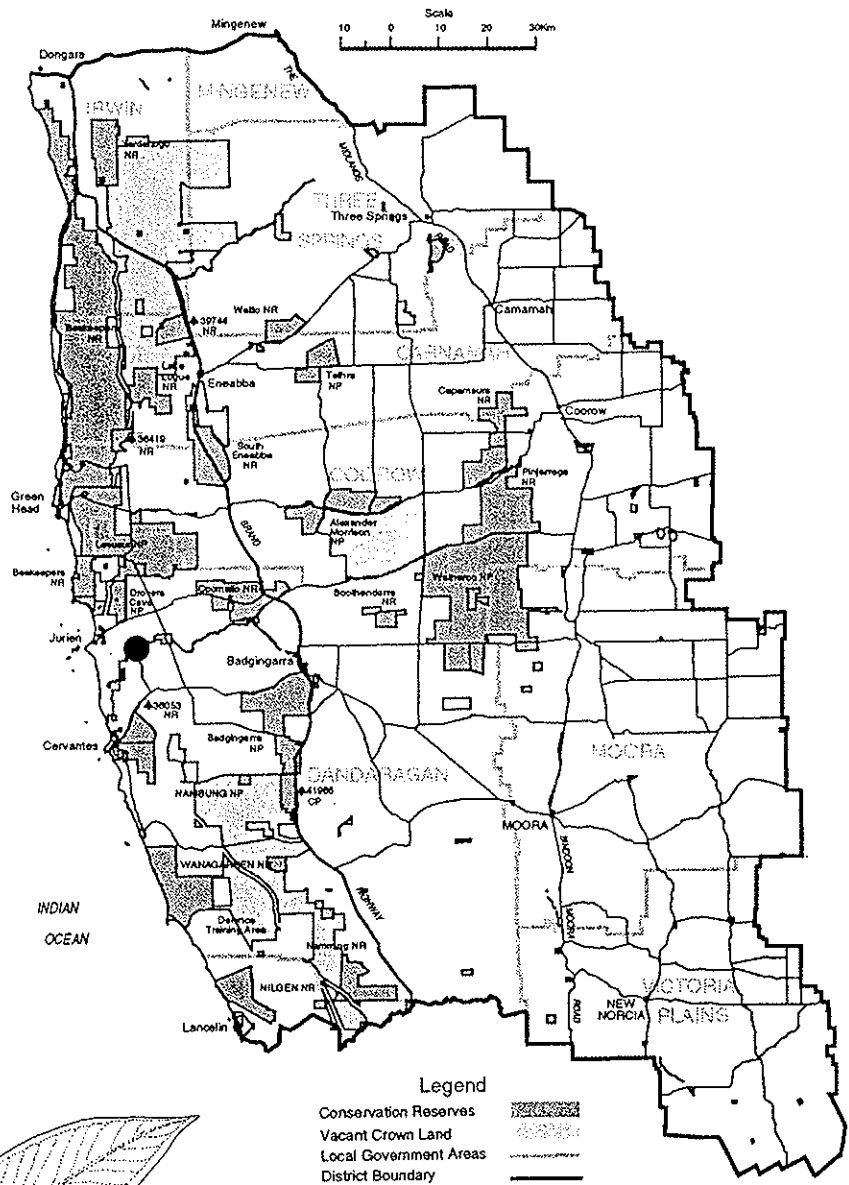
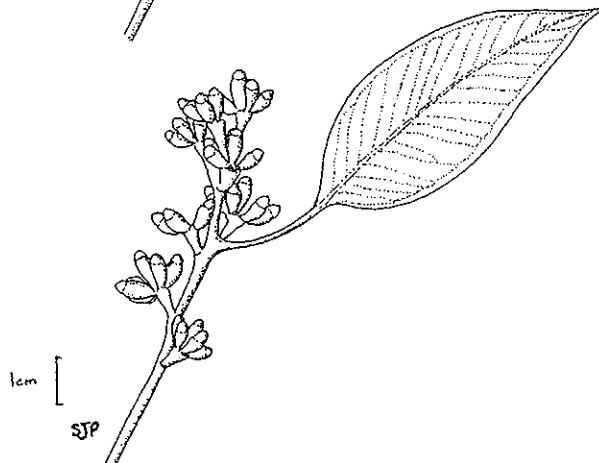
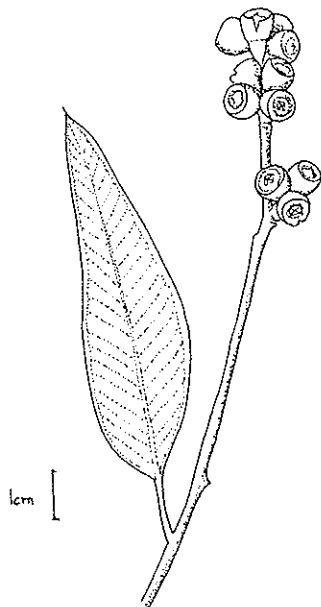
- Further survey is required to record the full extent of the known population and to find further populations in the District.
- Further research is necessary to determine the taxonomic status of the species in the District.

## References

Brooker and Kleinig (1990), Grayling and Brooker (1992), Kelly *et al.* (1990, 1995), Napier *et al.* (1988b).



Locality Map



*Eucalyptus balanites* P.M.Grayling & Brooker

MYRTACEAE

[*Eucalyptus* sp. E. Nambung (M.I.H.Brooker 9025)]

Cadda Road Mallee

This species was discovered in 1985 but no further populations have been found and it is known only from the original stand.

*Eucalyptus balanites* is an erect mallee to 5 m with rough, corky basal bark. The seedling leaves are oblong to elliptic, opposite and dull green in colour. The adult leaves are lanceolate, dull to slightly glossy, yellow-green in colour, with a dense vein network and oil glands. The inflorescences are axillary and unbranched, 11-flowered. The buds are on short stout stalks, the outer operculum shedding early to leave a scar. The inner operculum is hemispherical, narrower than the hypanthium. The buds are 1 x 0.7 cm. The stamens are inflexed and all are fertile. The fruit is hemispherical to cup-shaped with a thick rim, annular disc and four valves which are slightly exserted. The fruits are 0.9 x 0.9 cm.

This species is related to *Eucalyptus decipiens*, but differs in the corky, rough, basal bark, elliptical juvenile leaves and larger, acorn-like buds in which the operculum is hemispherical and narrower than the hypanthium at the join, and in the larger cup-shaped fruit. *E. decipiens* has spindle-shaped buds with an acute, conical or beaked operculum, heart-shaped juvenile leaves and rough bark over part or all of the trunk, and is usually found on calcareous soils. Recent studies suggest that *E. balanites* may be of hybrid origin, with *E. decipiens* and *E. lane-poolei* as the most likely parents (Grayling 1989), but, from study of seedlings, it appears to be stabilised and complies with guidelines for inclusion as DRF. However, few mature fruits and fertile seeds are produced. The stand has been shown to consist of at least two genetically distinct individuals.

**Flowering Period:** October-January

**Distribution and Habitat in the Moora District**

Known only from a single population on the northern edge of Badgingarra National Park, where it grows as an emergent above low, dense heath. Associated species include *Eucalyptus todtiana*, *E. lane-poolei*, *Nuytsia floribunda*, *Banksia candolleana*, *Lambertia multiflora* and *Hakea conchifolia*. Grows in grey-brown sandy loam with lateritic gravel on south-facing slopes.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Badgingarra	D	National Park, Shire Road Reserve	15.8.1991	25	Undisturbed, but a gravel scrape is close to the population

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed not susceptible



## Management Requirements

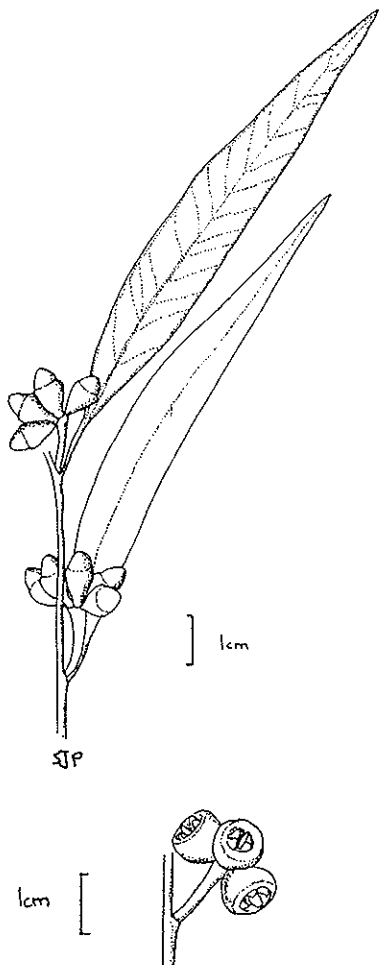
- Careful management of the site is required, particularly during firebreak maintenance and buffer burns.
- Monitor population regularly.
- Efforts should be made to prevent further encroachment of the gravel pit towards the population and to rehabilitate the area which has been excavated.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Ensure that dieback hygiene procedures are carried out at population.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

## Research Requirements

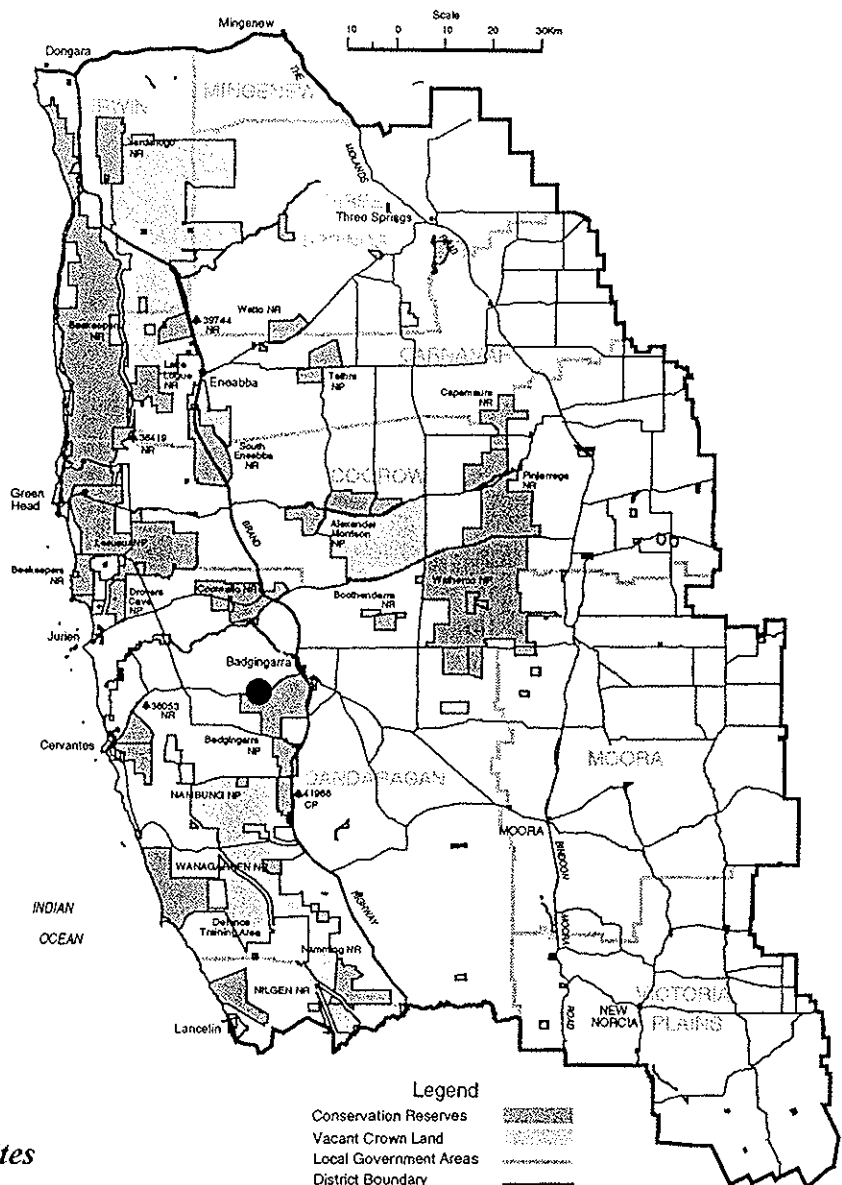
- Further survey is required in suitable habitat, particularly in conservation areas near the known population.
- Conduct research on fire response.

## References

Brooker and Kleinig (1990), Grayling (1989), Grayling and Brooker (1992), Kelly *et al.* (1995), Napier *et al.* (1988a).



● *Eucalyptus balanites*



## *Eucalyptus crispata* Brooker & Hopper

MYRTACEAE

[*Eucalyptus* sp. Yandanooka (M.I.H.Brooker 9205)]

Yandanooka Mallee

A mallee to 5m tall, erect or spreading, with smooth grey bark on the upper parts but with the basal bark persistent as peeling flakes. The juvenile leaves are dull and bluish in colour. The pith of the branchlets is glandular. The adult leaves are up to 1.5 cm wide and 9 cm long, lanceolate to sickle-shaped, green in colour and glossy. The vein network is dense and there are numerous oil glands. The inflorescences have up to 13 flowers, and have peduncles up to 16 mm long. The buds are 10 x 4 mm long, the operculum is cylindrical to conical. It is the same width as the hypanthium at the join on the mature buds. The fruit has a short stalk and is conical to cup-shaped, with a thin rim, a descending disc and 3 or 4 valves below the level of the rim. The seeds are pale grey-brown, almost spherical or cuboid in shape.

This species is similar to *Eucalyptus arachnaea*, which has longer, narrower buds with a conical to horn-shaped operculum, which is narrower than the hypanthium. It is also related to *E. accedens* which is a tree with smooth, powdery bark. There is some variation in *E. crispata* in the form of buds and fruit and in the overall appearance. Both *E. arachnaea* and *E. accedens* occur with the species at most populations except one which has been partially cleared. It is thought that *E. crispata* may be of recent hybrid origin with these species as parents.

**Flowering Period:** April-June

### **Distribution and Habitat in the Moora District**

Occurs in the Yandanooka-Eneabba area and south to Boothendarra, a range of ca. 90 km. A total of less than 150 plants have been estimated and only two populations occur on conservation reserves, one of ca. 30 plants, the other at present known from one plant.

*E. crispata* grows on clayey soils of shallow gullies, or on lateritic or granitic breakaways and slopes. Associated species include *Eucalyptus arachnaea*, *E. accedens*, *E. wandoo*, *Santalum acuminatum*, *Allocasuarina campestris* and *Melaleuca* sp.

### **Conservation Status**

Current: Declared Rare Flora

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Yandanooka	TS	Nature Reserve	13.3.1986	30 est.	Undisturbed
2. S of Eneabba	Co	Private	1.7.1992	5	Undisturbed
3. S of Eneabba	Co	Private	20.4.1989	2 clumps	Undisturbed
4. W of Arrino	TS	Private	7.1989	2	Undisturbed
5. First North Road	TS	Shire Road Reserve	23.11.1989	20+	Undisturbed
6. Yandanooka Hill	TS	VCL	23.11.1989	20+	Undisturbed
7. Boothendarra	D	Nature Reserve	29.4.1992	5+	Healthy and undisturbed
8. Dookanooka	TS	Nature Reserve	22.11.1989	1	Undisturbed

### **Response to Disturbance**

Unknown

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

Presumed not susceptible

### Management Requirements

- Protection of all populations from accidental destruction is essential.
- Monitor populations regularly.
- Ensure that markers are in place at population 5.
- Maintain liaison with land owners and land managers.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Test seed to determine if this species complies with criteria for DRF status.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

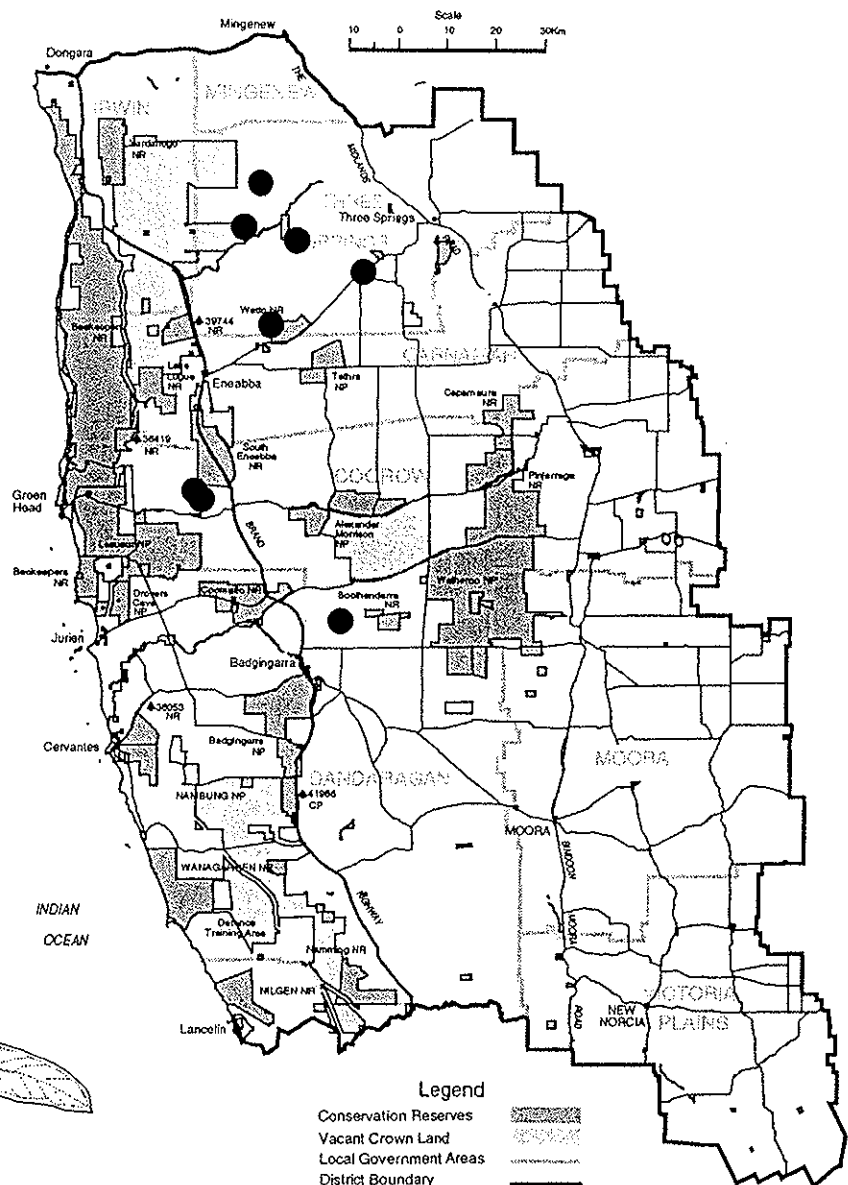
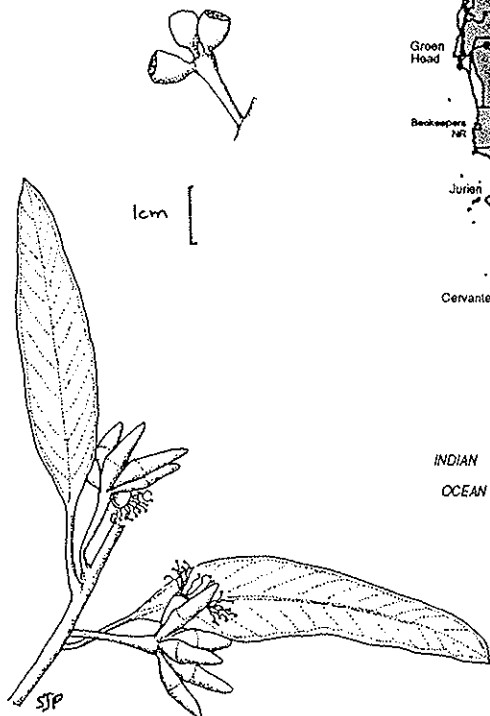
### Research Requirements

- Further survey in reserves on which populations 7 and 8 are located to determine full extent of the populations.
- Resurvey populations 2 and 3 and obtain precise location details with Global Positioning System.
- Conduct research on the fire response of the species.

### References

Brooker and Kleinig (1990), Brooker and Hopper (1991), Kelly *et al.* (1995), Napier *et al.* (1988a).

### ● *Eucalyptus crispata*



## *Eucalyptus dolorosa* Brooker & Hopper

MYRTACEAE

Dandaragan Mallee

A low mallee to 2.5 m tall with stout stems and rough grey bark on the older stems. The juvenile leaves are broadly falcate, light bluish-grey in colour. The adult leaves are slightly glossy, green in colour, lanceolate to falcate, 10 x 2 cm. They have a moderately dense vein network and numerous oil glands. The inflorescences are axillary, but are clustered at the leafless ends of branchlets, appearing apparently terminal. There are 7 flowers in each, the buds have pedicels up to 1 cm long, and are rhomboid in shape, 9 x 6 mm with a slightly beaked operculum. The stamens are very numerous. The fruits have stalks to 7 mm long, and are cup-shaped to globose, 1 x 1.4 cm, with four valves. The seeds are brown, pyramidal and winged.

This species is distantly related to *Eucalyptus todtiana* and *E. lateritica*, but differs in the small falcate leaves, apparently terminal inflorescences, long pedicels and glaucous juvenile leaves. The winged seed places the species in this group which also includes *E. buprestium*, *E. erectifolia* and *E. johnsoniana*. *E. dolorosa* is thought to be a relict species barely surviving extinction due to increased dryness of the climate in the late Pleistocene period.

**Flowering Period:** March

### **Distribution and Habitat in the Moora District**

Known from a single population on the slopes and summit of a lateritic hill east of Cataby. The population comprises eight 'clumps' over a few hectares on private property, which has been left uncleared by the owners for soil and nature conservation. Although the species has flowered each year for four years following its discovery in 1987, it was not found in fruit until February 1991. It grows in mallee heath in association with *Eucalyptus gittinsii*, *E. pluricaulis* and *E. abdita* amongst massive ironstone blocks over low scrub with associated species including *Hakea lissocarpha*, *H. undulata*, *H. obliqua*, *Calothamnus quadrifidus*, *Acacia pulchella* and *Scholtzia* sp.

### **Conservation Status**

Current: Declared Rare Flora

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. E of Cataby	D	Private	30.4.1991	25 plants or 8 'clumps'	Undisturbed

### **Response to Disturbance**

The population was burnt in 1978 and subsequently regenerated, but fruit set was not observed until 1991.

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

Presumed not susceptible

### **Management Requirements**

- Maintain close liaison with the landowner on whose property the population occurs.
- Inspect population at regular intervals.
- Ensure that dieback hygiene procedures are carried out at population.
- Protect, where possible, from frequent fires.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

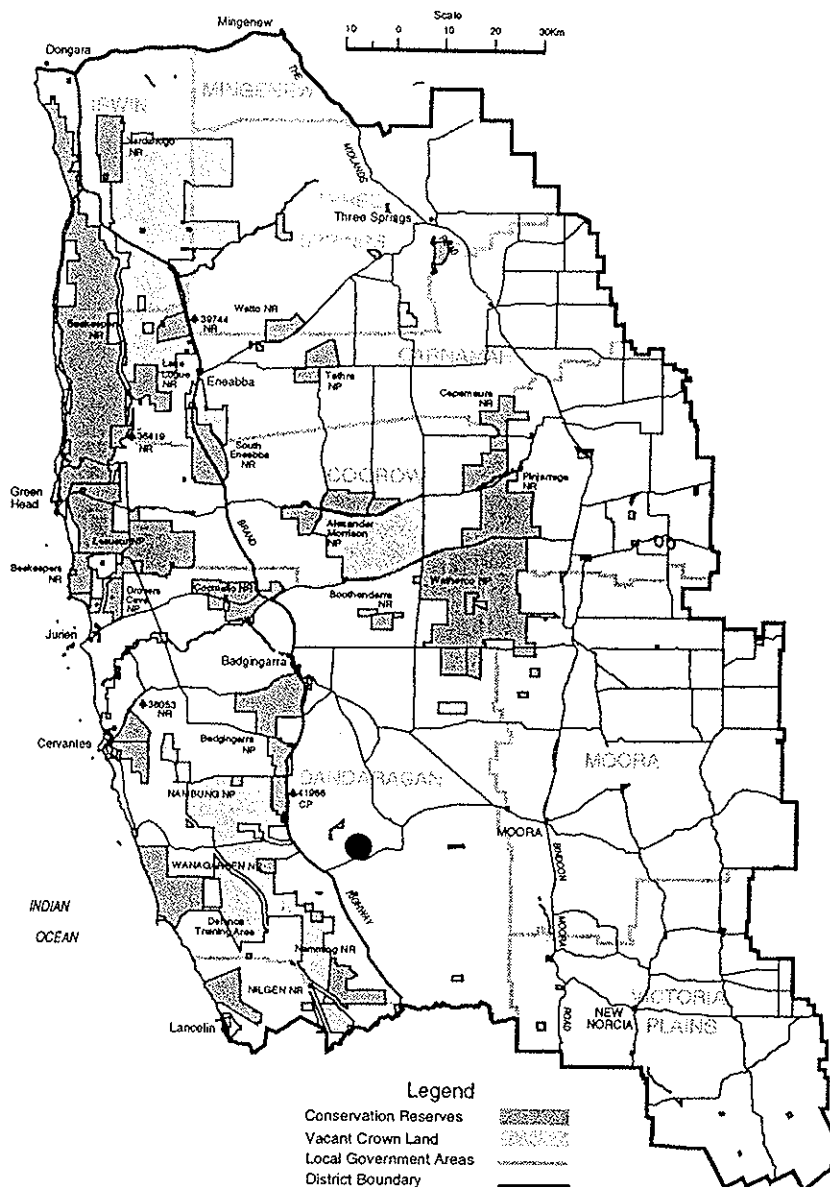
## Research Requirements

- Further survey of likely habits on lateritic hills in the surrounding area.
- Research on the reproductive biology and genetic structure of the population.
- Promote fruit set by hand pollination if necessary.

## References

Brooker and Kleinig (1990), Brooker and Hopper (1993), Kelly *et al.* (1995).

## ● *Eucalyptus dolorosa*



*Eucalyptus impensa* Brooker & Hopper

MYRTACEAE

[*Eucalyptus* sp. Eneabba (M.I.H.Brooker 9736)]

Eneabba Mallee

*Eucalyptus impensa* was found at the type locality in 1987, but was not seen in flower until July 1991. It is a straggling mallee to 1.5 m tall, with smooth stems, which are grey over pale copper in colour. The shoots of the new growth are green, not glaucous. The leaves on the mature plant are pale green to yellow-green (not glaucous), on short, stout petioles to 1 cm long. They are usually opposite, ovate in shape, to 14 x 8 cm. The inflorescence is single-flowered, in the axil of a leaf, the flower with a thick peduncle to 2 cm long. The bud has a hemispherical hypanthium and beaked operculum, which is slightly ribbed. It is up to 5 x 2.5 cm, including the pedicel length. The flowers are pink in colour. The fruit is sessile on a thick pedicel to 2 cm long. It is hemispherical in shape, to 2.5 x 6 cm, with a conspicuous raised disc and five exerted valves. The seeds are brown and asymmetrically pyramidal in shape. The large fruits are similar to those of *E. macrocarpa*, but *E. impensa* is distinguished by the non-glaucous leaves which have short stalks. It is also a much smaller mallee than *E. macrocarpa*.

**Flowering Period:** June-July

**Distribution and Habitat in the Moora District**

*E. impensa* is restricted to six populations with a total of less than eighty individuals growing over a range of ca. 3 km to the south-east of Eneabba. Five of these populations are on a nature reserve and the sixth on private property. The species has also been recorded from ca. 70 km to the south-east of the known populations, but was not refound during this survey, although remnant woodland of *Eucalyptus macrocarpa* occurs at the recorded location. It grows in very open shrub mallee over low heath on grey, gravelly sand on undulating plains and low breakaway slopes. This species occurs in association with other mallees, *Eucalyptus tetragona*, *E. johnsoniana*, *E. tottiana* and *E. macrocarpa* subsp. *macrocarpa*, and other species including *Xanthorrhoea* sp., *Hakea incrassata*, *H. conchifolia*, *H. obliqua*, *Banksia grossa*, *B. chamaephyton*, *B. lanata*, *Calothamnus quadrifidus* and *Verticordia grandis*.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Eneabba	Co	Nature Reserve	12.12.1992	12	Undisturbed
2. SW of Eneabba	Co	Private	19.4.1989	6	Undisturbed
3. SW of Eneabba	Co	Nature Reserve	20.4.1989	5, 1 "clump"	Undisturbed
4. SW of Eneabba	Co	Nature Reserve	19.4.1989	40	Undisturbed
5. SW of Eneabba	Co	Nature Reserve	20.4.1989	6	Undisturbed
6. SW of Eneabba	Co	Nature Reserve	1.3.1991	4 (originally 10 +)	Undisturbed
1.*NW of Moora	D	Shire Road Reserve or Private ?	30.7.1980	-	-

**Response to Disturbance**

Regenerates from the lignotubers after fire has destroyed the above ground parts, producing coppice of light green, petiolate leaves.

## Susceptibility to *Phytophthora* Dieback

Presumed not susceptible

## Management Requirements

- Monitor populations regularly.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

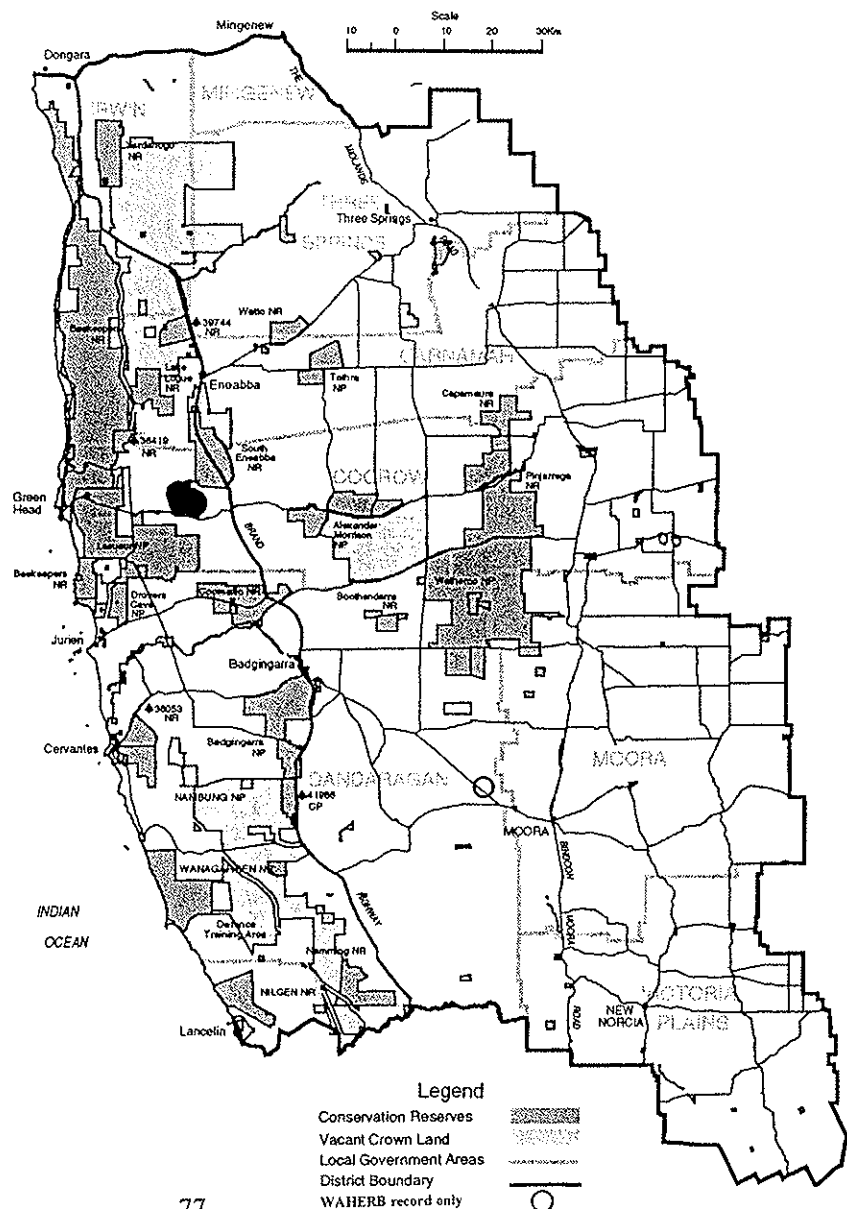
## Research Requirements

- Further taxonomic research is required at population 7.
- Further survey for new populations.
- Conduct further research on the fire response of the species.

## References

Brooker and Kleinig (1990), Brooker and Hopper (1993), Kelly *et al.* (1995).

## ● *Eucalyptus impensa*



## Johnson's Mallee

A small, spreading mallee to 2 m tall, forming dense clumps to several metres across. It has a dense crown of glossy, dark green to blue-green leaves, which often extends to the ground. The bark is grey-brown below, smooth, grey-brown to cream above and slightly rough and flaky at the base. The leaves are lanceolate, to 12 x 1.5 cm with numerous oil glands. There are 7 flowers in each unbranched, axillary inflorescence. The buds are club to pear-shaped, with a hemispherical to slightly conical cap. The fruits are globular, ca. 1 x 1 cm with a small opening and thick rim, the disc sunken with three or four valves which may protrude slightly. The seeds are brown and pyramidal. Occurs often in association with a mallee form of *Eucalyptus tottiana*, which has a rough, fibrous bark and apparently glandless leaves. It may be confused also with *E. lateritica* and *E. suberea*, both of which have double conic buds with conical opercula and *E. lateritica* has cup-shaped fruits. *E. suberea* has falcate adult leaves and up to 20 buds per inflorescence.

**Flowering Period:** July-January

**Distribution and Habitat in the Moora District**

Occurs between Eneabba and Badgingarra over a geographic range of ca. 30 km. The largest number of populations occurs in an area north of Warradarge Hill, extending north to a few kms south of Eneabba and south to the Coomallo area. When described in 1978 by Brooker and Blaxell, *E. johnsoniana* was known from only three populations along the Brand Highway. A total of ca. 27 populations are now known with about 300-350 plants. There has been difficulty in resolving the total number of populations found in the past owing to their scattered nature in relatively large areas of uncleared native heath. Grows as an emergent over dense low heath as small populations or as isolated plants on undulating sandplains, lateritic mesas and uplands. Grows in association with *Eucalyptus tottiana*, *E. tetragona*, *E. impensa*, *E. macrocarpa*, *E. drummondii* and *E. pendens* in grey or white sand over laterite. Associated heath species include *Dryandra armata*, *Lambertia multiflora*, *Hibbertia hypericoides*, *Hakea conchifolia*, *Allocasuarina humilis* and *Xanthorrhoea* sp. An unpublished survey (Lievense 1981) reported that the species occurred in the Lesueur area, but a voucher specimen from the survey and Beard 7814, from Mt Lesueur, identified at that time as *E. aff. johnsoniana*, have been identified subsequently as *E. suberea*.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Near Coomallo Hill	D	MRWA Road Reserve	14.8.1991	1 "clump" 2 plants in 1979	Undisturbed
2. Tootbardie Road	D	Shire Road Reserve, Private	14.8.1991	7+	Undisturbed
3.* NW of Coomallo Hill	-	Private	10.1980	-	Not recently found
4.* Brand Highway, N of population 1	Co	MRWA Road Reserve	19.8.1982	-	Not recently found
5.* Brand Highway, S of the Coorow-Greenhead Road	Co	MRWA Road Reserve	7.10.1975	-	Not recently found
6.* Brand Highway N of Banovich Road	Co	MRWA Road Reserve	7.10.1975	1	-



### Populations Known in the Moora District (Cont'd)

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
7. South Eneabba Nature Reserve	Co	Nature Reserve, MRWA Road Reserve	1.3.1991	30+	Undisturbed
8. NW of Coomaloo Hill	Co	Private	17.11.1981	-	In flower
9. E side of Brand Highway	Co	MRWA Road Reserve	1.3.1991	1+	Undisturbed
10. Lesueur National Park	Co	National Park	15.10.1980	-	-
11. South Eneabba Nature Reserve	Co	Nature Reserve	20.4.1989	1	-
12. Brand Highway	Co	Nature Reserve	1.3.1991	8	Disturbed
13. Brand Highway, N of Tootbardie Road	Co	MRWA Road Reserve	27.7.1984	50	-
14. N of Tootbardie Road	Co	Private	17.11.1981	-	-
15. N of Warradarge Hill	Co	Nature Reserve	20.11.1988	50+	Undisturbed
1.* S of Eneabba	Co	MRWA Road Reserve	1986	-	-
2.* S of Eneabba	Co	MRWA Road Reserve	11.3.1986	-	-
1. S of Eneabba	Co	Nature Reserve	20.9.1988	-	-
2. NNW of Warradarge Hill	Co	Nature Reserve	20.4.1989	50	-
3. NNW of Warradarge Hill	Co	Nature Reserve	20.4.1989	5	-
4. Shaw Road	Co	Nature Reserve, Shire Road Reserve	1.7.1992	50+	Undisturbed
5. Shaw Road	Co	Nature Reserve	1.3.1991	17	Undisturbed
6. N of Warradarge Hill	Ca	Nature Reserve	14.8.1990	7 clumps	Undisturbed
7. Shaw Road	Co	Nature Reserve	1.3.1991	5+	Undisturbed
8. N of Warradarge Hill	Co	Nature Reserve	12.1992	100+	-
9. ESE of Warradarge Hill	Co	Shire Road Reserve	12.1992	-	-
1.* S of Eneabba	Co	VCL (Mining Lease)	27.9.1977	-	Destroyed by mining

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Presumed not susceptible

#### Management Requirements

- Maintain liaison with managers of land on which the populations occur.
- All populations need to be revisited and plotted accurately.
- Monitor populations regularly.
- Ensure that markers are in place at all road reserve populations.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.
- Further survey is required, populations 3-6, 8, 13 and 14 urgently require inspection.

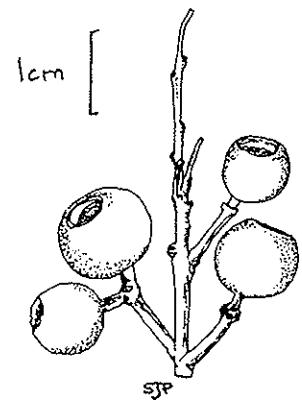
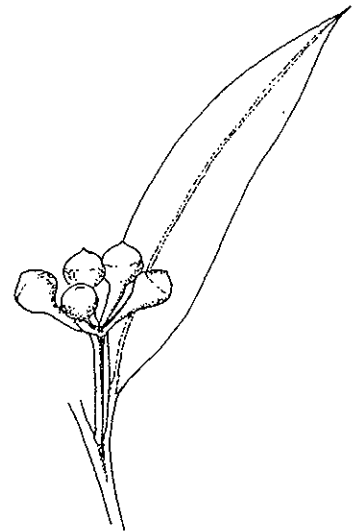
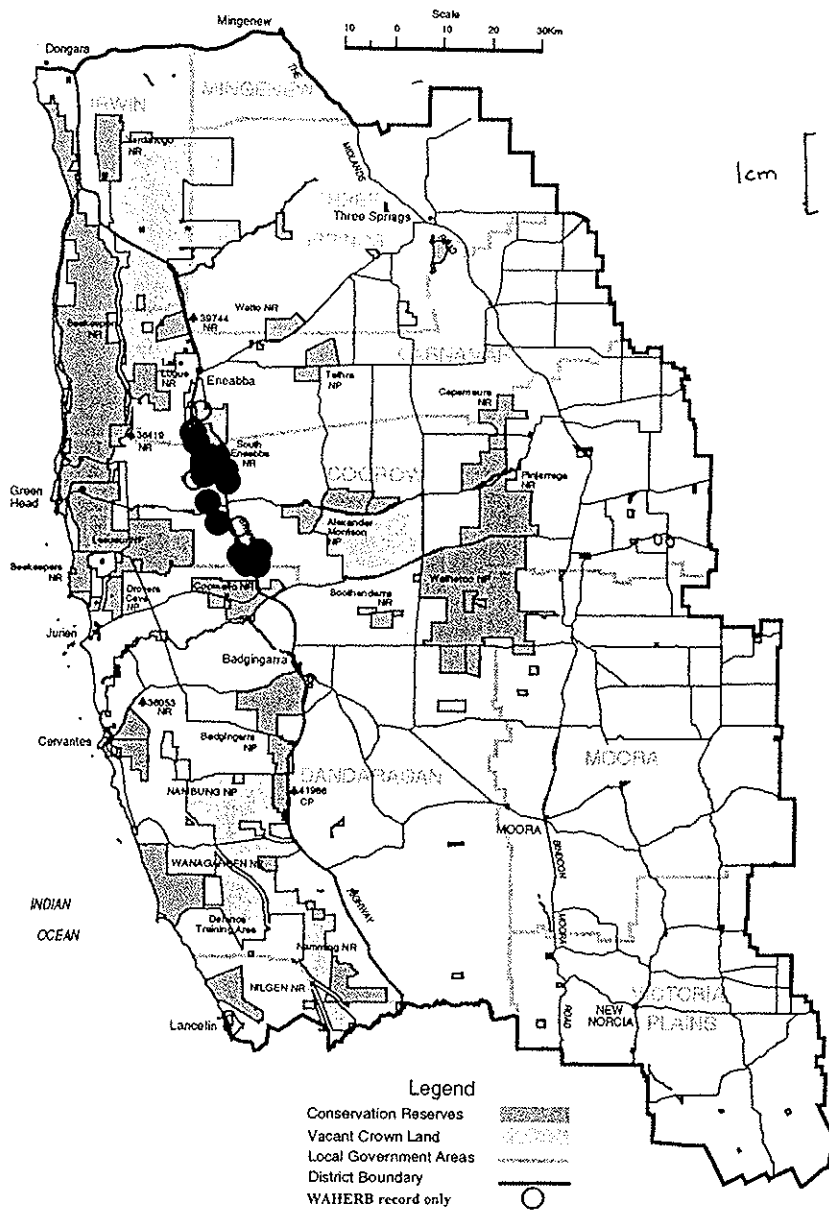
#### Research Requirements

- Conduct research on fire response of the species.

References

Brooker and Blaxell (1978), Brooker and Hopper (1986), Brooker and Kleinig (1990), Kelly *et al.* (1995), Lievens (1981), Napier *et al.* (1988a), Rye and Hopper (1981).

● *Eucalyptus johnsoniana*



## *Eucalyptus lateritica* Brooker & Hopper

MYRTACEAE

Laterite Mallee, Mt Michaud Mallee

A low, erect-stemmed mallee or tree-mallee to 3 m, usually with rough grey-brown bark on the lower stems or mostly smooth. The leaves are thin and slightly glossy, green to dark green on both surfaces, lanceolate in shape and up to 10 x 1.5 cm with sparse venation and numerous oil glands. There are up to 11 club-shaped buds in each axillary inflorescence, and they are slightly rough-surfaced, double conic in shape, without a scar, up to 1 x 0.7 cm. The fruits have a thick rim, and are cup-shaped or truncate-globose, with a ring-like or obliquely descending disc, to 1.5 x 1.5 cm. The seeds are brown and narrowly pyramidal with lateral wings. *Eucalyptus lateritica* appears to be most closely related to *E. todtiana* from which it is distinguished by its finer bark, erect stems, longer pedicels, double-conic buds, the sparse venation and presence of glands in the leaves and by the winter flowering season. The specific name refers to the lateritic gravels which dominate the upland regions on which it grows, in contrast to the deep sands on which *E. todtiana* grows.

**Flowering Period:** August-October

### Distribution and Habitat in the Moora District

Restricted to the Gairdner Range, Coomallo Hill area where it occurs in small, isolated populations of usually less than 20 individuals on the slopes and breakaways of dissected, lateritic uplands. It has an identical geographic range to that of *E. suberea*, extending from Mt Lesueur for ca. 30 km inland, and is found in the same habitat. It grows in sandy lateritic soils in mallee heath with *Eucalyptus accedens*, *E. gittinsii*, *E. suberea*, *E. drummondii*, *E. marginata* and *E. gardneri*. Associated species of the heath include *Banksia lanata*, *B. micrantha*, *Hakea trifurcata*, *Calothamnus quadrifidus* and *Dryandra* species.

### Conservation Status

Current: Declared Rare Flora

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Warradarge	Co	Private	10.1984	50 est.	-
2. Coomallo E of Highway	D	Nature Reserve	22.10.1984	5 est.	-
3. & 13. SE of Warradarge	Co	Private	28.2.1991	3 "clumps" of 100+ stems	Good
4. Mt Lesueur	D	National Park	5.1982	1	-
5. NE of Mt Lesueur	Co	National Park	3.1983	3	-
6. NE of Mt Lesueur	D	National Park	1.3.1983	5	-
7. S of Mt Peron	D	National Park	2.3.1983	4	-
8. NE of Mt Michaud	D	National Park	3.1983	1	-
9. & 10. Mt Benia	D	Unvested Reserve	3.3.1983	1+	Undisturbed
11. Coomallo W of Highway	D	Nature Reserve	3.3.1983	5	Insect damaged
12. Coomallo	D	Private	3.7.1992	30 est.	Disturbed
14. W of Mt Michaud	D	National Park	7.1988	10	-
15. W of Mt Michaud	D	National Park	7.1988	10	-

### Response to Disturbance

Populations 3 and 13 were last burnt in 1966.

**Susceptibility to *Phytophthora* Dieback**

Presumed not susceptible

**Management Requirements**

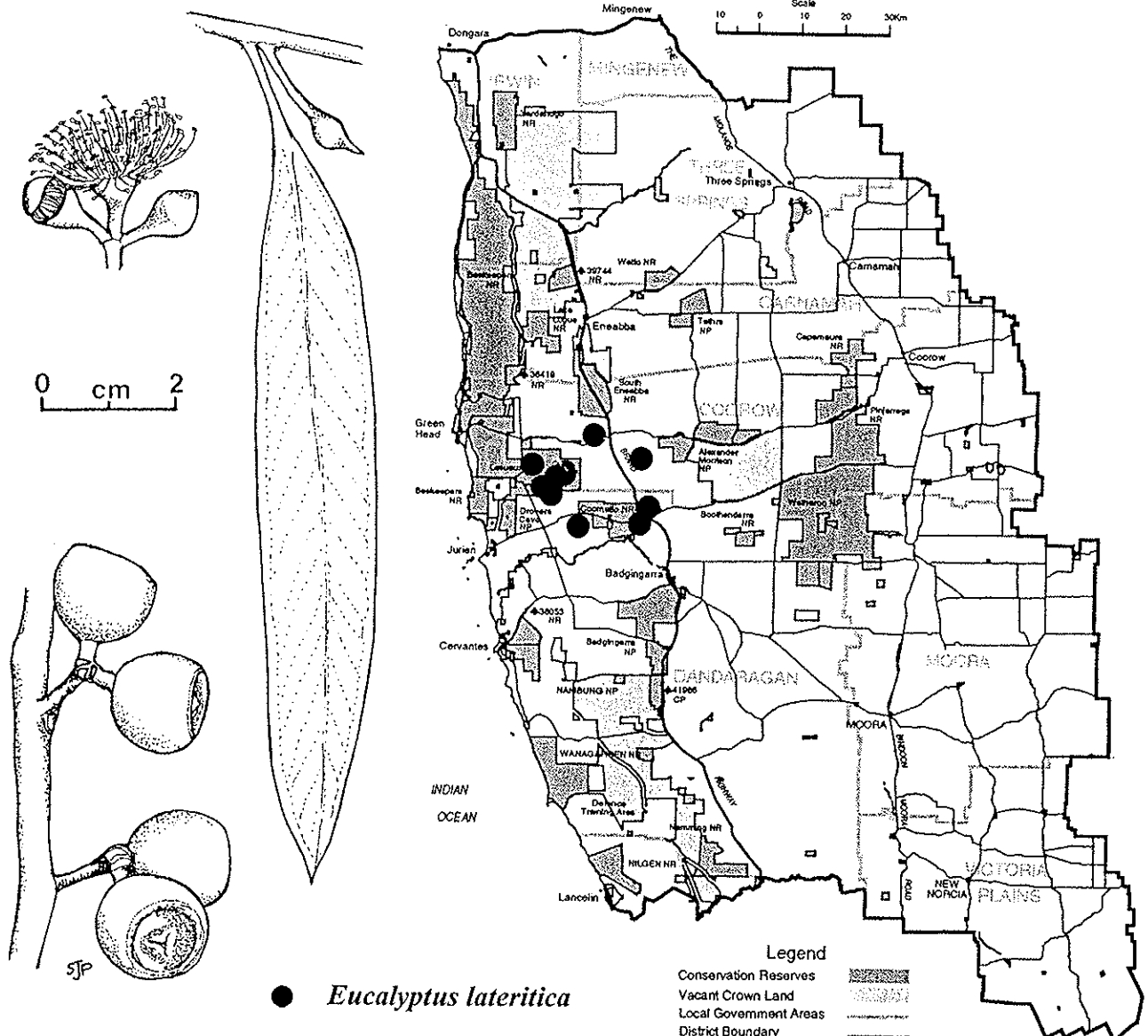
- Inspect populations regularly.
- Maintain liaison with landowners.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

**Research Requirements**

- Resurvey populations 3 and 13 and obtain precise location information with a Global Positioning System.
- Further research is required on the relationship of the species to other apparently related species.
- Conduct research on the fire response of the species and its susceptibility to *Phytophthora* species.

**References**

Brooker and Hopper (1986), Brooker and Kleinig (1990), Kelly *et al.* (1995), Napier *et al.* (1988a), Rye and Hopper (1981).



● *Eucalyptus lateritica*

## *Eucalyptus leprophloia* Brooker & Hopper

MYRTACEAE

Scaly-butt Mallee

An erect mallee to 5 m tall, with light grey-brown, loose, curly bark for 1 m from the base, smooth, grey to pinkish-grey above. The juvenile leaves are ovate, dull, blue-green to glaucous, to 8 x 5 cm. The adult leaves are lanceolate to broad-lanceolate, 14 x 2.5 cm, dull and green, with fine venation and scattered glands. There are 7 to 11 buds in the inflorescence which is on a flattened peduncle to 1 cm long. The buds are ovoid, with short pedicels and an obtusely conical operculum. The fruits are cup-shaped to barrel-shaped, without stalks or almost so. The disc is descending and there are three or four valves to rim level. The seed is grey-black and almost smooth.

This species is related to *Eucalyptus accedens* and *E. zopherophloia*. *E. accedens* is a tree with smooth, pinkish-white, powdery bark, with dull, blue-green adult leaves. *E. zopherophloia* is a blackbutt, with dark, fibrous bark on the lower half of the stems. Both its juvenile and adult leaves are narrower than those of *E. leprophloia* and the oil gland pattern differs. It occurs on calcareous soil, not on lateritic soils as does *E. leprophloia*.

**Flowering Period:** August-December

### **Distribution and Habitat in the Moora District**

Known from five populations, over ca. 90 km, three to the north of Badgingarra, and two on the northern border of the Moora District in the Mt Adams area. There has been an unconfirmed report of a sixth population in the latter area. One population grows on slopes in brown loam over laterite, as an emergent mallee over scrub with associated species including *Eucalyptus accedens*, *Allocasuarina humilis*, *Gastrolobium spinosum* and *Dryandra fraseri*. The most northerly population occurs on gentle valley slopes in low woodland of *E. accedens* over heath in white sand, and a population in the same area occurs on grey sand and laterite with *E. todtiana*. At the type location it grows in grey sandy clay loam on slopes of a drainage line between two breakaways with *E. falcata* and *E. gittinsii* over heath. It has also been recorded growing with *E. calophylla* and *E. wandoo* over open low scrub with *Hakea undulata*, and *Calothamnus sanguineus* in grey sand and lateritic gravel.

### **Conservation Status**

Current: Declared Rare Flora

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. NE of Coomaloo	Co	Private	28.2.1991	60-70 (in 1 clump) with 190 stems	Healthy and undisturbed
2. Mt Adams	TS	VCL	15.11.1979	1+	Undisturbed
3. Mt Benia	D	Unvested Reserve	2.5.1991	1+ (20 stems)	Undisturbed
4. ESE of Mt Adams	TS	Private	24.5.1991	70+ stems	Undisturbed, but buds have aborted due to insect damage
5. Boothendarra	D	Nature Reserve	29.4.1992	5+	Healthy

### **Response to Disturbance**

Unknown

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

Presumed not susceptible

### Management Requirements

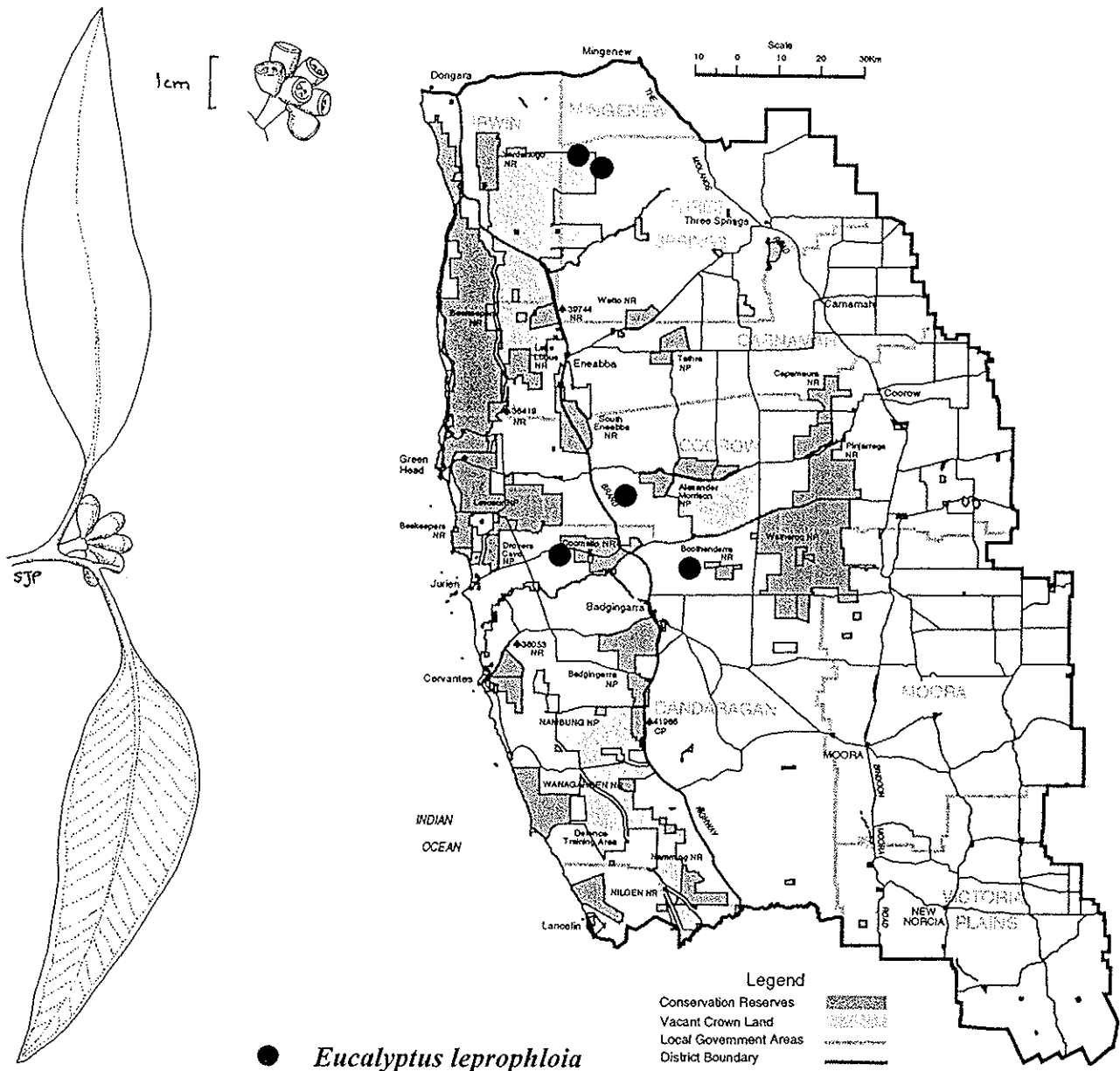
- Inspect populations regularly.
- Maintain liaison with landowners.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### Research Requirements

- Further survey for new populations particularly to the northern end of the species' known range where population 2 requires urgent inspection, and there is an unconfirmed report of a sixth population.
- Conduct research on fire response of the species.

### References

Brooker and Kleinig (1990), Brooker and Hopper (1993), Kelly *et al.* (1995), Napier *et al.* (1988a).



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

MYRTACEAE

[*Eucalyptus* sp. Midlands Highway (M.I.H.Brooker 8734)]

Midlands Gum

A tree or mallee to 7 m, usually 2.5-5 m, with dull leaves and glaucous branchlets. The tree forms of this species have a stocking of rough, grey bark on the lower trunk but the mallee forms have smooth bark throughout the stem. The leaves are dull, grey-green, broad-lanceolate, 8-15 cm long. The inflorescences are simple, 7-11 flowered, the buds ovoid to fusiform, glaucous, with a conical bud cap. The fruits are cup-shaped to cylindrical.

This species is closely related to *Eucalyptus accedens*, differing in its rough bark, slightly larger buds and glaucous fruits, buds and branchlets. It is thought to hybridise with *E. accedens* in some places.

**Flowering Period:** January

**Distribution and Habitat in the Moora District**

This species is known from nine populations over a range of ca. 160 km from Mogumber to Arrino, north of Three Springs. Grows in open, low mallee woodland emergent from heath or scrub with *Allocasuarina campestris*, and species of *Dryandra*, *Grevillea*, *Gastrolobium* and *Acacia* in yellow sand or brown, sandy loam and lateritic gravel or quartz, usually on midslopes, fairly high in the landscape.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. NW of Watheroo	Mo	Shire Road Reserve, Private	14.11.1990	5-7	Some damage from fencing and grading
2. NW of Watheroo	Mo	National Park	22.8.1991	4	Undisturbed, at edge of track
3. NW of Three Springs	TS	MRWA Road Reserve	19.9.1991	4	Partly disturbed
4. Gillingarra	VP	Private	28.4.1992	5	Undisturbed
5. NW of Three Springs	TS	Shire Road Reserve	25.9.1990	4	In gravel pit
6. NW of Watheroo	Mo	Private	17.11.1992	18	Trees only remaining, understorey cleared and weedy
7. NE of Watheroo	Mo	Private	21.2.1994	6	Growing around gravel pit and in paddock, owner will fence.
8. NW of Watheroo	Mo	National Park	12.9.1993	6	Undisturbed
9. NW of Three Springs	TS	Shire Road Reserve	18.8.1993	10+	Undisturbed

**Response to Disturbance**

Plants at population 1 produced coppice after damage by road grading.

## Susceptibility to *Phytophthora* Dieback

Unknown

## Management Requirements

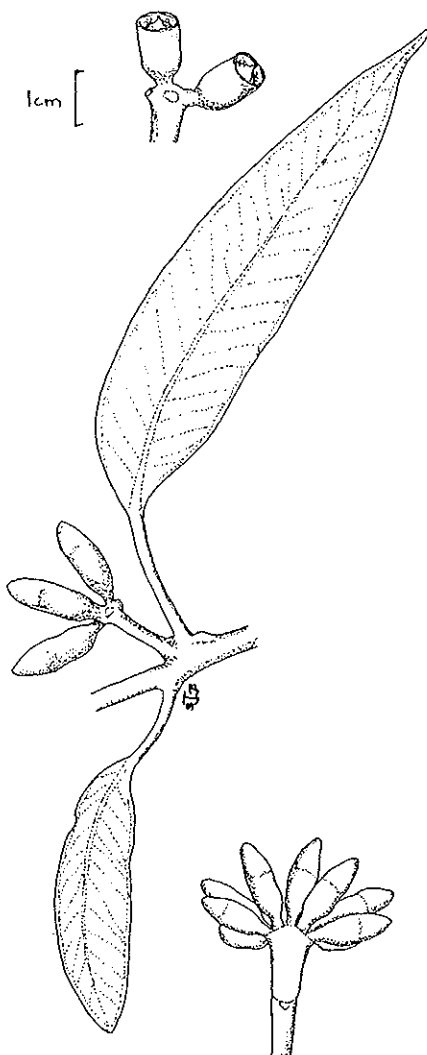
- Inspect populations regularly.
- Maintain liaison with landowners/managers and local government authorities.
- Fence populations 6 and 7.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Ensure that markers are in place at population 9.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

## Research Requirements

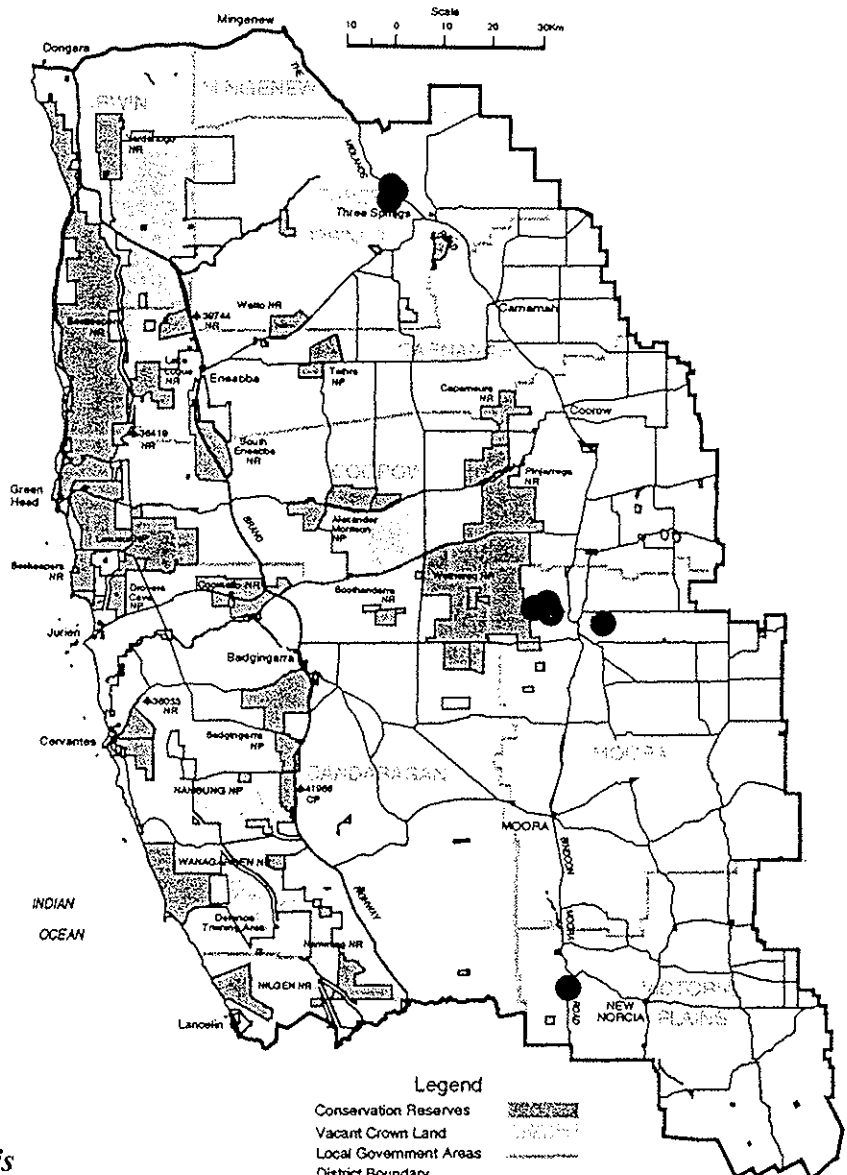
- Conduct research on fire response of the species.

## References

Hill and Johnson (1992), Kelly *et al.* (1995).



● *Eucalyptus pruiniramis*





*Eucalyptus rhodantha* Blakely & H.Steedman var. *petiolaris* Blakely MYRTACEAE

Rose Mallee

*Eucalyptus rhodantha* var. *petiolaris* differs from var. *rhodantha* in its leaves, which have short stalks, and which are never stem clasping. They are yellowish-green and heart-shaped to lanceolate in shape.

**Flowering Period:** March-November (peaking June-August)

**Distribution and Habitat in the Moora District**

Restricted to the Watheroo and Three Springs areas, where it is sometimes associated with var. *rhodantha* in sand on flat or undulating country. A total of only nine plants has been recorded, from road reserve and private property. A Management Plan and a Recovery Plan detailing strategies for conservation have been prepared (Sampson *et al.* 1990) and are in the process of implementation.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Three Springs	TS	Shire Road Reserve	15. 7.1993	1	-
2. SW of Three Springs	TS	Private	15.7.1993	1	-
3. NE of Watheroo	Mo	Private	1.6.1994	2	Moderate
4. NE of Watheroo	Mo	Private	15.6.1993	2	Healthy
5. NE of Watheroo	Mo	Private	5.8.1993	1	-
6. NE of Watheroo	Mo	Private	29.7.1980	1	-
7. NE of Watheroo	Mo	Private	29.7.1980	1	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed not susceptible

**Management Requirements**

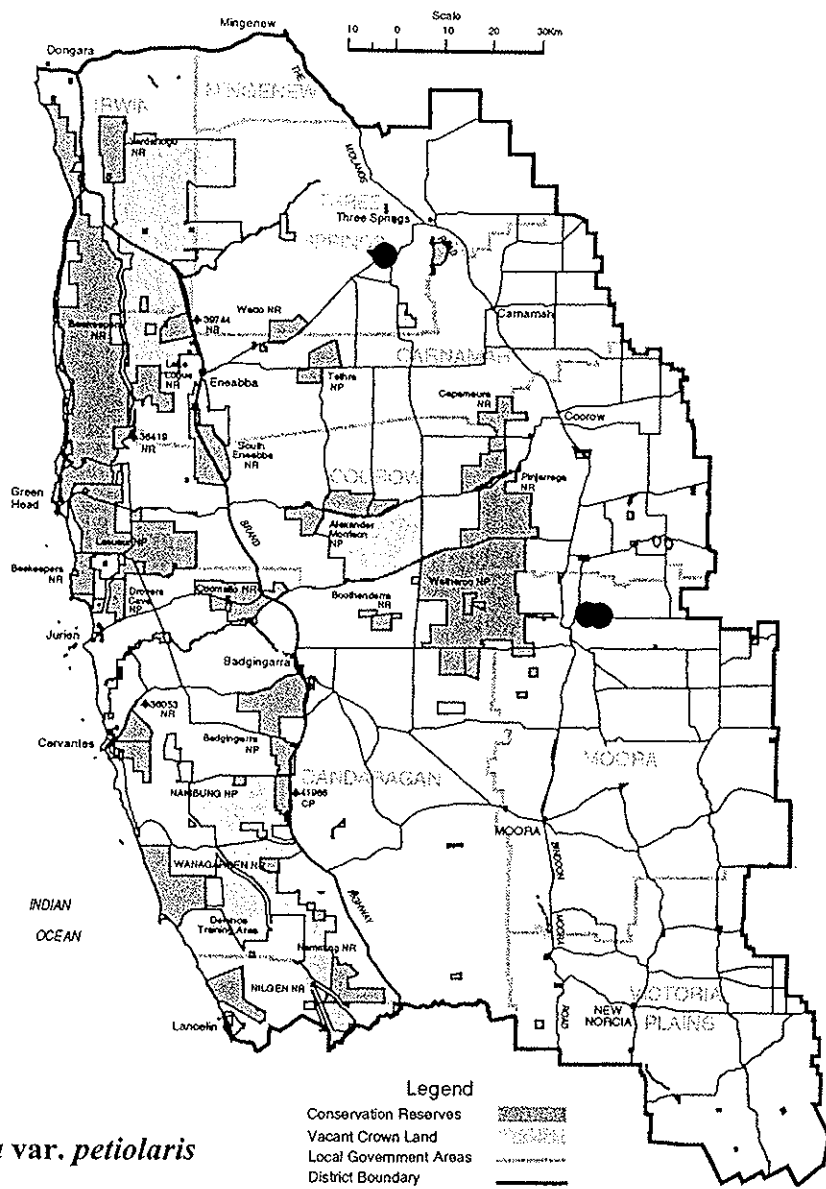
- Protection from road maintenance and grazing is essential.
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey required in the area north-west of Moora.

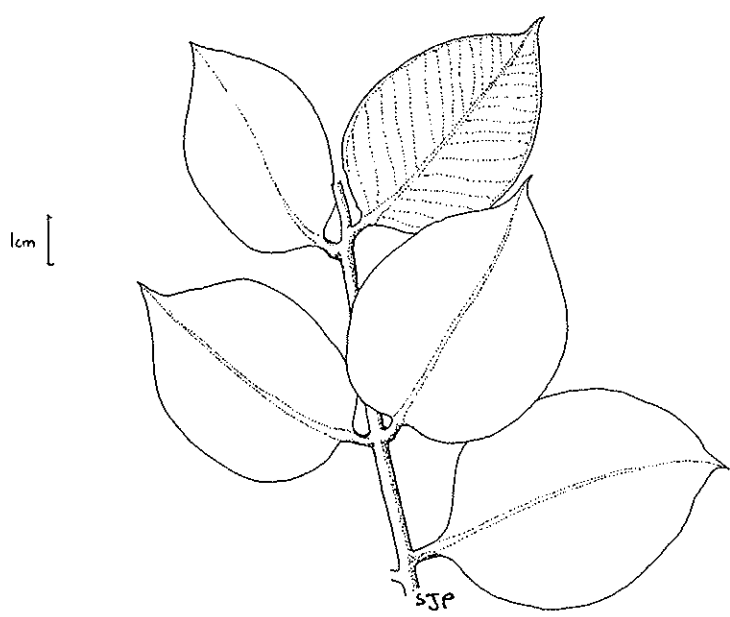
**References**

Brooker and Kleinig (1990), Kelly and Coates (1995), Kelly *et al.* (1995), Napier *et al.* (1988a), Sampson *et al.* (1990).



● *Eucalyptus rhodantha* var. *petiolaris*

Legend  
 Conservation Reserves [stippled pattern]  
 Vacant Crown Land [dotted pattern]  
 Local Government Areas [solid line]  
 District Boundary [thick solid line]



*Eucalyptus rhodantha* Blakely & H.Steedman var. *rhodantha*

MYRTACEAE

Rose Mallee, Rose Gum

A low, straggling mallee to 3 m high, with smooth, grey-brown bark and white-grey branches. The leaves are blue-grey and glaucous, stalkless and usually in opposite pairs on the branches. They are rounded to heart-shaped, usually pointed at the tip and up to 8 cm x 8 cm. The flower buds are grey and pendulous, up to 5.5 x 4 cm, with the pointed cap longer than the base. The large red (rarely white) flowers are borne on long pedicels and peduncles, 1-3.5 cm long and there is usually one, but may be up to three flowers per inflorescence. Each flower is up to 7.5 cm across. The fruits are more or less hemispherical, or top-shaped, up to 3 cm x 5 cm, with protruding valves. The seeds are dark brown and winged.

Distinguished from var. *petiolaris* by the stalkless, rounded leaves which are glaucous and stem clasping. Similar to *Eucalyptus macrocarpa*, which has more elongated leaves, larger, stalkless flowers and fruits and the buds and fruits are not pendulous.

**Flowering Period:** March to November (peak flowering June to August) depending on the site (McNee 1986, Sampson 1988)

**Distribution and Habitat in the Moora District**

Endemic to the Moora District where it is restricted to an area between Watheroo and Three Springs, occurring sometimes in association with var. *petiolaris*. Grows in small communities on flat or undulating country, emergent from scrub or heath, on sand or sandy loam soil, often with gravel. Associated species include *Allocasuarina campestris*, *Dryandra ashbyi*, *Calothamnus quadrifidus*, *Acacia* sp., *Hakea* sp. and *Gastrolobium spinosum*.

A detailed Management Program outlining strategies for management and conservation has been prepared for this species (Sampson *et al.* 1990). This is in the process of implementation, and conservation of the species is being achieved through the good will and assistance of private landowners, local shires and authorities. During the course of implementation five new populations have been found in remnant vegetation on private land.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Three Springs	TS	Shire Road Reserve	7.1993	13	Healthy
2. SW of Three Springs	TS	Shire Road Reserve	7.1993	10	Healthy to moderate
3. NE of Watheroo	Mo	Shire Road Reserve, Private	1.6.1994	25	Moderate, declined from 37 plants in 1985/86, 13 in paddock
4. NE of Watheroo	Mo	Shire Road Reserve	6.1993	9	Moderate, one plant in poor condition, weeds.
5. NE of Watheroo	Mo	Private	1.6.1994	6	Healthy to moderate
6. NE of Watheroo	Mo	Private	1.11.1992	1	-
7. NE of Watheroo	Mo	Private	5.8.1993	29	Healthy, regenerating from fire, narrow strip of uncleared bush

### Populations Known in the Moora District (Cont'd)

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
8. NE of Watheroo	Mo	Private	5.8.1993	26	Healthy, on narrow strip of uncleared bush
9. NE of Watheroo	Mo	Private	5.8.1993	56	Healthy, on narrow strip of uncleared bush
10. NE of Watheroo	Mo	Private	5.8.1993	5	Healthy, on narrow strip of uncleared bush
11. NE of Watheroo	Mo	Private	5.8.1993	200+	Healthy
12. W of Three Springs	TS	Shire Road Reserve	15.11.1979	4	-
13. E of Railway Road	Mo	Nature Reserve, Shire Road Reserve	1.6.1994	333	Healthy
14. Carot Well Road	Mo	Shire Road Reserve	1.6.1994	1	Healthy
15. NE of Watheroo	Mo	Private (proposed Nature Reserve)	6.1993	194	Most healthy, some plants in poor condition, ?senescence, insects
16. NE of Watheroo	Mo	Private (proposed Nature Reserve)	6.1993	160	Healthy

### Response to Disturbance

A limited investigation on the effects of fire on seedling recruitment and vegetative regeneration (Sampson 1988) showed that 29 of 30 plants began coppicing at the onset of the first growing season after a moderate April fire. Some flowered two years after the fire. There was little seedling recruitment and no seedlings survived. However, it is thought that this may be due to loss of seed by seed predators such as ants, because the area that was burnt was small. Observations at the site demonstrated that fire may have an important role in the reproductive biology of *E. rhodantha* by stimulating the release of large amounts of seed from the canopy. In large natural stands this would satiate seed predators but allow enough seed to remain, so that when other environmental conditions were favourable, seedling recruitment would occur.

It has been found that there was a substantial increasing in inbreeding in a remnant stand of 14 plants isolated in land cleared for agriculture. The level of outcrossing was significantly lower than that determined for an uncleared stand (Sampson 1988). Observations suggest that small remnants of *E. rhodantha* are less fecund than the larger populations and the plants appear less vigorous.

As the plant is thought to be pollinated mainly by honey-eaters which use a variety of flowering species occurring locally, weed invasion resulting in degradation of the habitat and loss of other native species may affect pollination as well as the vigour of the plants themselves. No damage or loss was observed of new vegetative growth produced after a burn, when sheep were excluded from the area, but rabbits and kangaroos still had access to the plants. New shoots on plants where stock have been grazing are usually stripped of leaves.

### Susceptibility to *Phytophthora* Dieback

Presumed not susceptible. However, dieback is known to kill some associated species which support pollinators, whose presence is essential to the survival of *E. rhodantha*.

### Management Requirements

- Continuation of the required actions as outlined in the Management Program for *E. rhodantha* (Sampson *et al.* 1990) and in the Recovery Plan (Kelly and Coates 1995).
- Ensure that all road reserve populations have markers.
- Maintain liaison with landowners/managers and local government authorities.

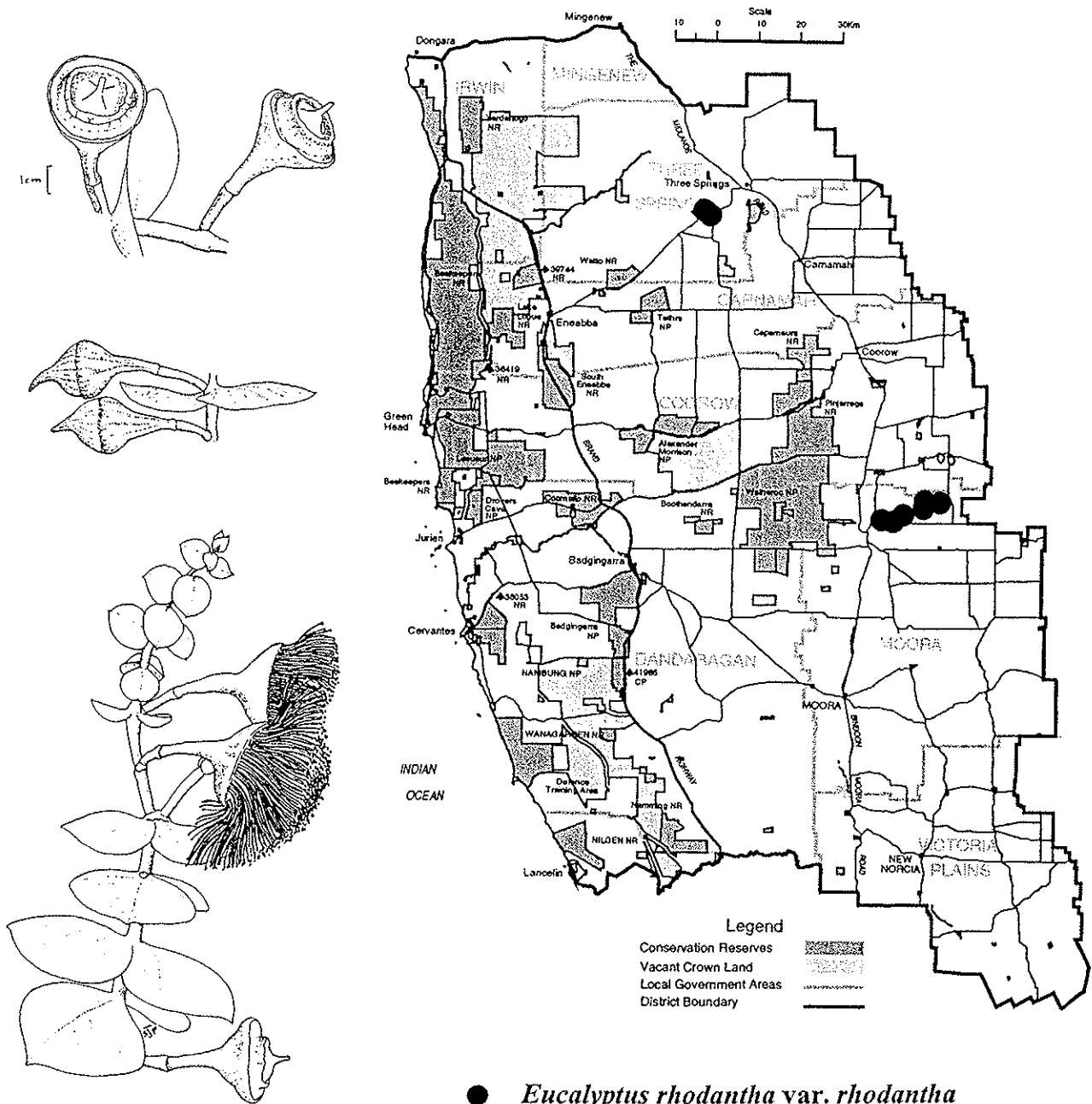
- Monitor populations regularly.
- Control weeds.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Investigate the possibility of land acquisition in the area of the largest population.
- Ensure that dieback hygiene procedures are carried out at all populations.

### Research Requirements

- Further investigation is required to determine whether increased inbreeding is associated with decreased fitness.
- Further survey is required on uncleared land at population 11.
- Conduct research on fire response of the species.

### References

Blakely *et al.* (1938), Brooker and Kleinig (1990), Kelly and Coates (1995), Kelly *et al.* (1995), Leigh *et al.* (1984), Lucas and Syngé (1978), McNee (1986), Napier *et al.* (1988a), Rye and Hopper (1981), Sampson (1988), Sampson *et al.* (1990).



● *Eucalyptus rhodantha* var. *rhodantha*

*Eucalyptus suberea* Brooker & Hopper

MYRTACEAE

Cork Mallee, Mount Lesueur Mallee

A mallee to 3 m tall or up to 6 m in older individuals, with thick, grey, corky, rough bark at the base of the stem, which may be flaky, thicker and yellowish in larger specimens, and is smooth above. The juvenile leaves are lanceolate, olive green and slightly glossy. The adult leaves are falcate to lanceolate, dark green, slightly glossy and up to 9 x 1.5 cm. They have sparse venation and numerous oil glands. The adult leaves are of the same colour on both surfaces. The inflorescence may have from 11 to more than 20 buds. It has a peduncle up to 1.5 cm long. The buds are smooth, club-shaped to broadly spindle-shaped up to 0.7 x 0.5 cm with a conical to hemispherical operculum. The flowers are white, with all stamens fertile. The fruits are truncate-globose or rarely urn-shaped, with a thin rim and descending disc, 0.9 x 1.1 cm. The seed is D-shaped, brown and shining.

*Eucalyptus suberea* has no close relatives and is easily distinguished by the small truncate-globose fruits, grey-yellow corky bark, many-flowered inflorescences and small, brown D-shaped seeds.

**Flowering Period:** December-March

**Distribution and Habitat in the Moora District**

Known from the Mt Lesueur to Coomallo Creek area, over a range of ca. 30 km, in seventeen small populations. Grows in open mallee communities over dense low heath, on or near lateritic breakaways and the edges of mesas, with *Eucalyptus lateritica*, *E. gittinsii*, *E. marginata*, *E. calophylla*, *E. accedens*, *E. drummondii*, *E. exilis*, *E. pendens* and other associated species including *Hakea neurophylla*, *H. varia*, *Banksia tricuspis*, *Daviesia epiphylla* and *Kingia australis*.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Warradarge	Co	Private	10.1984	39	-
2. Coomallo	D	Nature Reserve	22.10.1984	30	-
3. & 17. NE of Coomallo	Co	Private	28.2.1991	200+ (in 4 clumps)	Undisturbed
4. NE of Mt Lesueur	D	National Park	1.3.1983	3	-
5. NNE of Mt Lesueur	D	National Park	24.5.1983	2	-
6. Mt Peron	D	National Park	2.3.1983	-	-
7. Mt Peron	D	National Park	2.3.1983	-	-
8. NE of Mt Peron	D	National Park	2.3.1983	2	-
9. NW of Mt Michaud	D	National Park	3.3.1983	7	-
10. Mt Benia	D	Unvested Reserve	3.3.1983	1	-
11. Coomallo	D	Nature Reserve	3.3.1983	10	-
12. Coomallo	D	Private	3.7.1992	50	Disturbed
13. Mt Michaud	D	National Park	22.4.1982	3	-
14. NW of Mt Lesueur	D	National Park	17.7.1979	1	-
15. ENE of Mt Lesueur	D	National Park	20.9.1979	1	-
16. Mt Lesueur	D	National Park	16.9.1976	-	-

**Response to Disturbance**

Populations 3 and 17 were last burnt in 1965-66. One of these populations has had light sheep grazing with apparently no effect.

## Susceptibility to *Phytophthora Dieback*

Presumed not susceptible

### Management Requirements

- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Monitor populations regularly.
- Maintain liaison with landowners.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

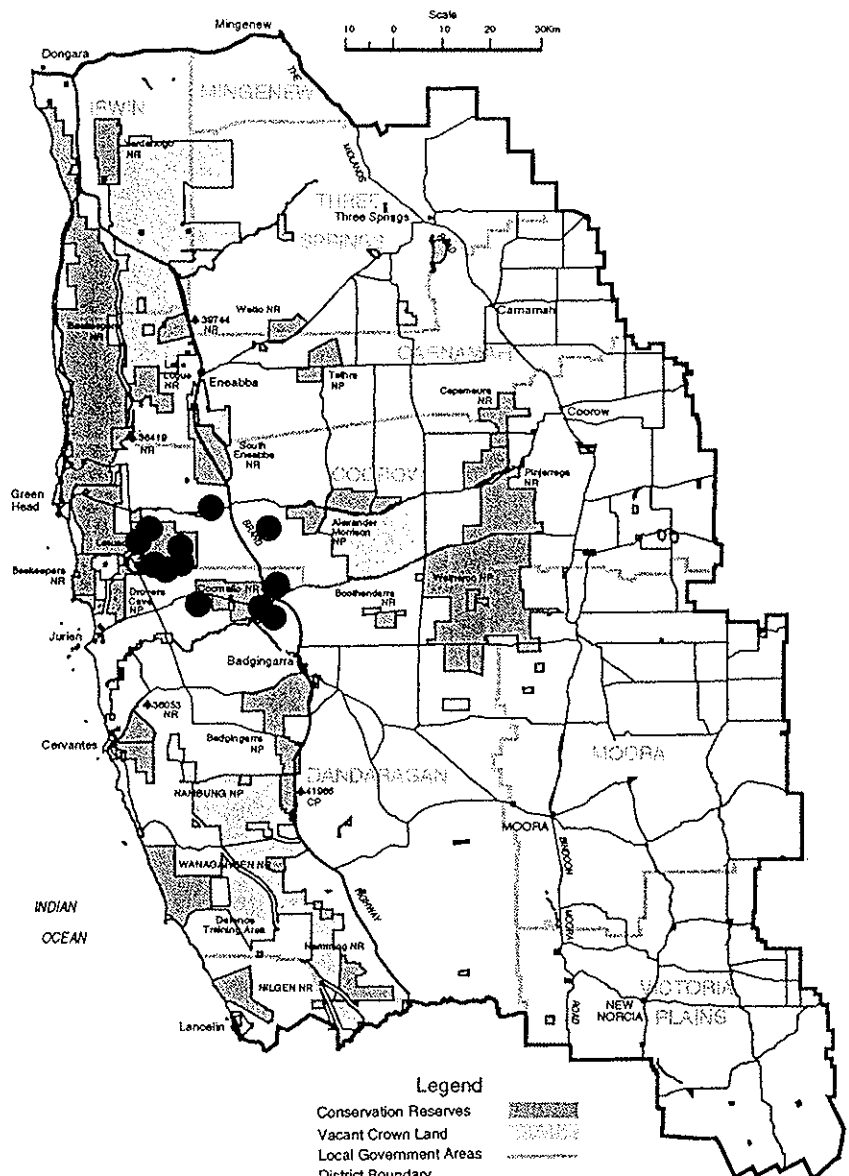
### Research Requirements

- Resurvey populations 3 and 17 and obtain accurate location information with a Global Positioning System.
- Resurvey all populations in the Lesueur National Park and obtain Global Positioning System readings for each.
- Conduct research on the fire response of the species.

### References

Brooker and Hopper (1986), Brooker and Kleinig (1990), Kelly *et al.* (1995), Napier *et al.* (1988a).

## ● *Eucalyptus suberea*



## *Gastrolobium appressum* C.A.Gardner

FABACEAE

Scale-leaf Poison

*Gastrolobium appressum* was described in 1964 by C.A. Gardner who collected it first in 1957. It is a small woody shrub up to 0.5 m high, with the young branches covered with fine, white hairs. There are no stipules at the base of the short leaf stalk. The leaves are leathery, ending in a fine, sometimes hooked point. They are hairless, pale green, up to 1 cm long and 0.3 cm wide, borne in whorls of three or sometimes four on plants in populations at the southern end of the range. They are closely pressed against the stem, often overlapping the next whorl so that the stem is hidden. The flowers are borne above the leaves in several whorls of three, clustered at the ends of the branchlets. They are ca. 1 cm long, pea-shaped, with a lobed, two-lipped calyx, with the three lobes of the lower lip, lanceolate and pointed at their tips. The petals are orange-yellow and reddish-purple. The fruit is a hairy pod containing two hard seeds.

**Flowering Period:** September-November

### **Distribution and Habitat in the Moora District**

Known from a very restricted distribution in the Gunyidi District between Watheroo and Marchagee over a range of ca. 25 km, with a single population ca. 20 km further east. It has also been collected from Miling, which is ca. 40 km to the south-east of the present known range of the species. It grows mainly on low, quartzite gravel hills of the Coomberdale Chert formation, on a geological fault which runs approximately north-south between Watheroo and Coorow. It grows in quartz gravel and white or yellow sand on the crowns and slopes of small gravel hills, in vegetation ranging from thicket to open low scrub, over low heath to open dwarf scrub. The plant communities in which it occurs are usually dominated by *Allocasuarina campestris*, with *Hakea sulcata*, *Actinostrobos pyramidalis*, *Allocasuarina drummondiana*, *Grevillea integrifolia*, *Verticordia grandiflora*, *Melaleuca* sp. and *Acacia* sp.

In 1983 the species was known from 10 collection sites recorded in the Western Australian Herbarium. In that year M. Burgman conducted a survey for the species and was unable to find three of those populations, which were thought to have been destroyed by road works or agricultural clearing. However, he found 7 new populations and a total of 2659 plants in 14 populations. Since then one of these populations has been destroyed. A volunteer-based survey of rare *Gastrolobium* species carried out in 1989 and co-ordinated by J. Sampson, found two small, new populations and relocated seven previously known populations. It was estimated that the total number of plants was still around 2000. Since then a further road verge population and one population on a nature reserve have been found.

### **Conservation Status**

Current: Declared Rare Flora

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Near Gunyidi	Co	MRWA Road Reserve	17.10.1991	84	Partly disturbed, some weed infestation
2. N of Watheroo	Mo	MRWA Road Reserve	17.10.1991	49	Partly disturbed, some weed infestation
3. N of Watheroo	Mo	MRWA Road Reserve	17.10.1991	48	Undisturbed, some weed infestation
4. N of Watheroo	Mo	MRWA Road Reserve, Private	17.10.1991	29	Partly disturbed, some weed infestation
5. S of Marchagee	Co	Railway Reserve, Shire Road Reserve	3.8.1989	30	Disturbed



### Populations Known in the Moora District (Cont'd)

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
6. NE of Gunyidi	Co	Private	12.11.1982	217	Population fenced
7. S of Marchagee	Co	Railway Reserve, Shire Road Reserve	3.8.1989	57	Good
8. S of Marchagee	Co	MRWA Road Reserve, Private	17.10.1991	200+	Partly disturbed, some weed infestation, fencing required
9. W of Geraldton Highway	Co	Shire Road Reserve, Private	17.10.1991	30	Partly disturbed, some weed infestation, fencing required, 100 plants in 1982
10. S of Marchagee	Co	MRWA Road Reserve	17.10.1991	62	Partly disturbed, some weed infestation
11. S of Marchagee	Co	MRWA Road Reserve, Private	17.10.1991	122	Partly disturbed, some weed infestation, fencing required
12. S of Marchagee	Co	MRWA Road Reserve	17.10.1991	200 est.	Partly disturbed, some weed infestation, 1214 plants in 1982
13. S of Marchagee	Co	Private	16.11.1982	36	
14. N of Marchagee	Co	MRWA Road Reserve	17.10.1991	40 est.	Partly disturbed, some weed infestation
15. WNW of Gunyidi	Co	Private	20.9.1983	30	Area quarried, partly disturbed, fenced
16. NW of Gunyidi	Co	MRWA Road Reserve	31.8.1989	1	Disturbed
17. NE of Watheroo	Mo	Shire Road Reserve, Private	16.8.1993	30 est.	Undisturbed, but on very narrow verge
18. Gunyidi	Mo	Nature Reserve	9.10.1992	-	-
1.* Miling	Mo	-	21.11.1973	-	-

#### Response to Disturbance

*G. appressum* has been observed growing well in disturbed roadside soil, firebreaks and around gravel pits. It is reported to be poisonous to stock but the species has not been tested for the presence of monofluoro-acetate. Plants growing on private land e.g. populations 9 and 11, are often short and bunched, with many branches at ground level, indicating that the plant is grazed. The species prefers open situations and appears to be excluded from adjacent mid-dense stands of *Allocasuarina* spp.

#### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

#### Management Requirements

- Ensure that dieback hygiene procedures are carried out at all populations.
- The species should be excluded from prescribed burning until response to fire is known.
- Ensure that rare flora marker pegs are in place at all roadside and rail reserve populations.
- Inspect populations annually, particularly those not inspected recently.
- Maintain liaison with land owners and land managers.
- Redetermine which of the populations on private land require fencing.
- Investigate the possibility of acquisition of the railway/road reserve as a nature reserve.
- Investigate the possibility of acquiring land adjacent to population 17 as a nature reserve as two other species of Declared Rare Flora also occur there.

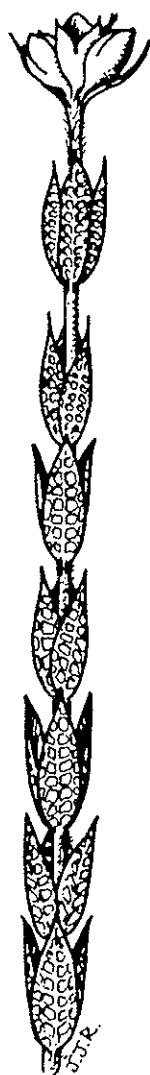
- Carry out weed control where necessary.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### Research Requirements

- Conduct research on fire and life history.
- Survey the uncleared private land adjacent to population 17, and reserves nearby for further populations.
- Complete full survey of population 18 and survey the nature reserve on which it occurs for further populations.
- Resurvey populations 6, 13 and 15, which have not been visited recently and establish which if any require fencing.
- Fence populations 8, 9 and 11.

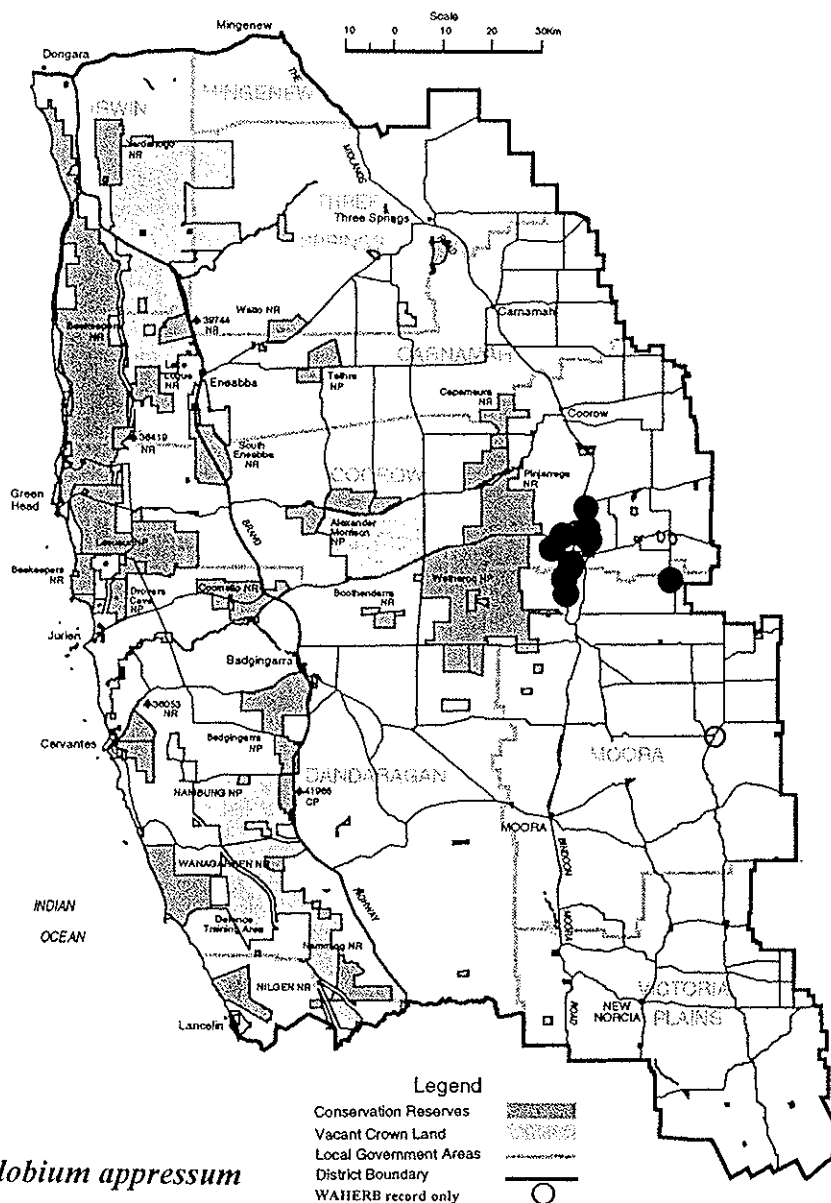
### References

Aplin (1973), Burgman (1983), Everist (1981), Gardner and Bennetts (1956), Gardner (1964), Leigh *et al.* (1984), Rye and Hopper (1981), Sampson and Hopper (1989, 1990).



5mm

● *Gastrolobium appressum*



## *Gastrolobium hamulosum* Meisn.

FABACEAE

Hook-point Poison

*Gastrolobium hamulosum* was found to be the most endangered of all the rare *Gastrolobium* species surveyed in 1989 and was recommended for declaration as Rare in 1990 (Sampson and Hopper 1990). It is a small, erect, somewhat straggling shrub to 45 cm tall, with numerous slender branchlets covered with short, white, conspicuous hairs. The leaves are blue-green in colour, with conspicuous net veins and the midrib raised beneath. They are obovate in shape, with a wide, blunt tip which has a characteristic hooked point. They are arranged in whorls of three up the stems, not overlapping. The flowers are arranged in short racemes at the ends of the branches. The calyx is silky hairy, with long hairs and has deeply divided lobes which taper to long points. The petals are golden yellow, streaked with red. This species is similar to *G. parvifolium*, but the latter differs in its crowded leaves which are not whorled, and in the glabrous calyx.

**Flowering Period:** August-October

### **Distribution and Habitat in the Moora District**

Known from the Wongan Hills in the Merredin District, and Calingiri in the Moora District over a geographic range of ca. 40 km. The population in the Moora District is of one plant on a railway reserve, the populations in the Merredin District consist of one population on a road verge, and three populations on a Department of Agriculture reserve. The total number of plants known is 125. The species has also been recorded in the past from east of New Norcia, east of Carani and between Moora and Watheroo in the Moora District. It grows on pale yellowish clay-loam with some sand and gravel on clay flats, or white and grey sand or sandy clay, sometimes in disturbed ground with other coloniser shrubs including *Baeckea crispifolia*, *Gastrolobium calycinum*, *Mirbelia spinosa*, or in low heath with *Allocasuarina campestris*, *Melaleuca* spp, *Eucalyptus* sp. and tall sedges. It has also been recorded from quartzite ridges.

### **Conservation Status**

Current: Declared Rare Flora

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. (2.) Calingiri	VP	Railway Reserve	10.9.1991	1	Disturbed and weedy
3.* 148-149 mile peg, Geraldton Highway	-	-	11.9.1964	-	-
4.* Between Moora and Watheroo	-	-	13.9.1932	-	-
5.* 10 miles E of New Norcia	-	-	22.9.1955	-	-
6.* 5 miles E of Carani	-	-	16.9.1964	-	-

### **Response to Disturbance**

*G. hamulosum* appears to be a colonizer, growing in disturbed areas and is probably killed by fire. It becomes excluded from weed infested road verges and may not tolerate canopy cover.

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

Presumed susceptible

### Management Requirements

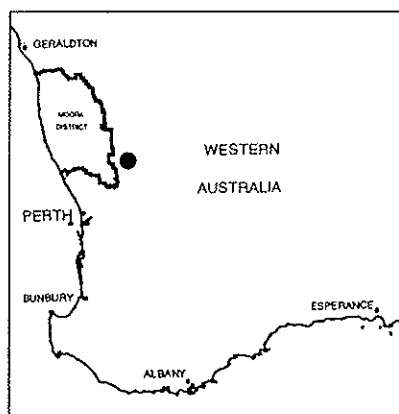
- Ensure that dieback hygiene procedures are carried out at the population.
- Monitor the population regularly.
- Install markers at the population.
- It would be desirable to fence the single plant to prevent damage.
- Maintain liaison with land managers.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### Research Requirements

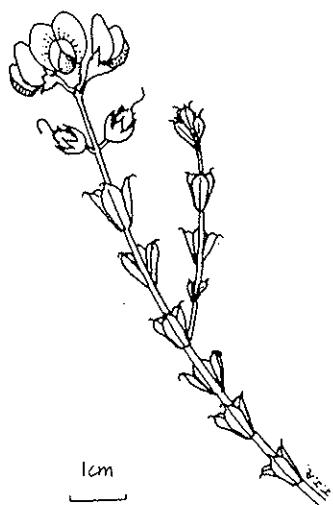
- Further survey is required in suitable habitat within the known range and in the New Norcia, Carani and Moora-Watheroo areas.
- Conduct research on fire response and population biology.

### References

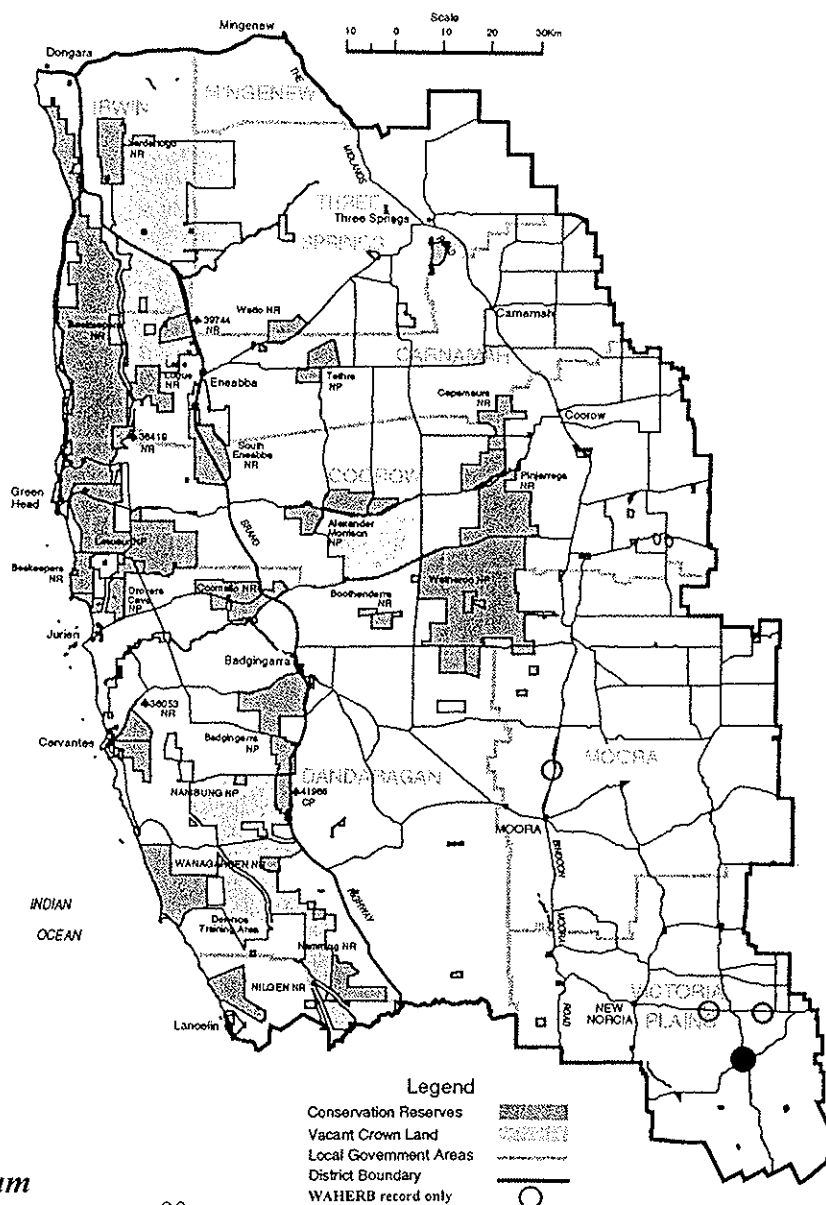
Aplin (1973), Bentham (1864), Everist (1981), Gardner and Bennetts (1956), Leigh *et al.* (1984), Rye (1980), Sampson and Hopper (1989, 1990).



Locality Map



● *Gastrolobium hamulosum*



*Grevillea batrachioides* F.Muell. ex McGill.

PROTEACEAE

Mt Lesueur Grevillea

This species was presumed extinct and was known only from a collection made by James Drummond until an unidentified specimen collected by E.A. Griffin in 1982 was recognised by P. Olde as *Grevillea batrachioides*. The population from which the collection had been made was subsequently re-found in 1991.

It is an upright shrub to 1 m tall, with rounded hairy branchlets and stiff leaves, which are divided into 3-5 narrow lobes. These may be further unequally divided. The under surface of the leaf has spreading hairs and is rolled under, leaving only the midrib exposed. The leaves are ca. 1.5 cm long. The flowers are borne in simple inflorescences ca. 5 cm long at the ends of the branches, and are red in colour. Each flower has a pedicel 12-13 mm long. The perianth is dilated at the base to 3.5-4 mm across, and is hairy on the outside, with a few hairs on the inside. The pistil is 37 mm long, hairy except at the base and the apex. The ovary is also hairy.

*G. batrachioides* is related to *G. asparagoides*, which has shorter pedicels and longer leaves. McGillivray suggested that the treatment of *G. batrachioides* and *G. maxwellii* as subspecies of *G. asparagoides* would also be an appropriate systematic treatment of these taxa (McGillivray 1993).

**Flowering Period:** September-October

**Distribution and Habitat in the Moora District**

Known from one population in the Lesueur area, where it occurs around flat sandstone outcrops in brown sandy loam on north-west facing slopes below a breakaway. It grows in dense heath with open woodland of mallees and *Banksia tricuspis*. Associated species include *Dryandra armata*, *Hakea undulata*, *Daviesia chapmanii*, *Conospermum nervosum* and *Diplopeltis* sp.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Lesueur	D	National Park	23 9.1992	10 est.	Good

**Response to Disturbance**

The area in which the population occurs was burnt 1985, and since the species was re-collected there in 1991, indicates that the plants must have regenerated from seed and/or resprouted since the fire.

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

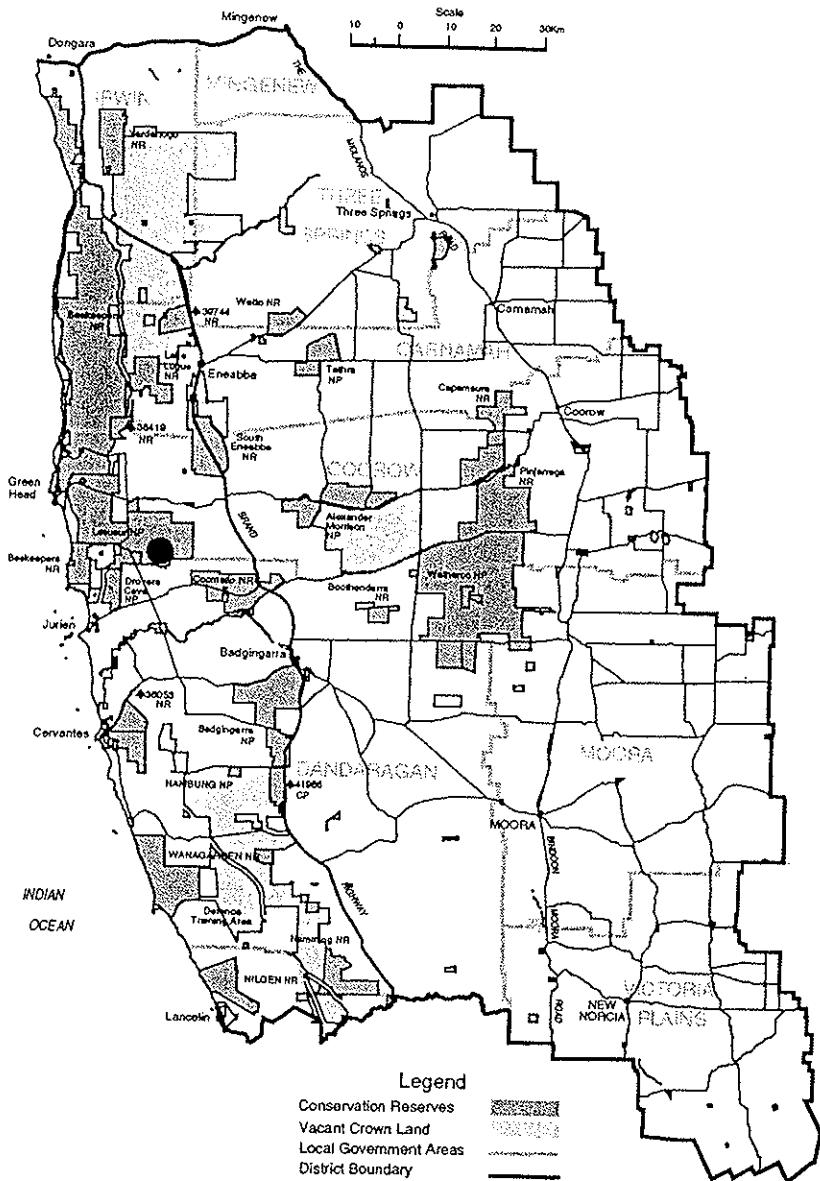
- Ensure that dieback hygiene procedures are carried out at the population.
- Monitor population regularly.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

**Research Requirements**

- Survey for new populations particularly within the National Park in areas of suitable habitat.
- Investigate the fire response of the species and its susceptibility to dieback.

**References**

Lesueur National Park and Coomallo Nature Reserve. Draft Management Plan (1994), McGillivray (1993), Olde (1986).



● *Grevillea batrachioides*

## Foote's Grevillea

A spreading, flat-topped shrub to 1 m tall and 1 m across, with a conifer-like appearance. The branches are spreading, ridged and tomentose. The leaves are rigid, greyish yellow-green, to 7.5 cm long, divided into stiff linear lobes, up to 7 per leaf. Flower heads are mainly confined to the edges and lower sides of the branches. Each flower head has 15-30 flowers, which are pouched, hairy on the outside, ca. 8 mm long, greenish-yellow on the outside, ageing to apricot-orange. The style is 30-40 mm long, maroon to blackish in colour. The fruit is 13-18 mm long, 8-9 mm wide, with a densely hairy surface and persistent style.

An Interim Recovery Plan has been written for this species by CALM and is currently being implemented.

**Flowering Period:** April, August-September

**Distribution and Habitat in the Moora District**

Known from six populations over a geographic range of five km to the W of Dandaragan. The species occurs in grey or yellow sand over laterite or in sandy clay, sometimes on slopes in shallow gullies between lateritic ridges. Grows in low heath and dwarf scrub under open low woodland of *Eucalyptus todtiana* and *E. calophylla* with associated species including *Calothamnus quadrifidus*, *Hakea trifurcata*, *H. prostrata*, *Allocasuarina humilis* and *Gastrolobium spinosum*.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. S of Mt Misery	D	Water Reserve	20.8.1993	6 adult, 16 seedlings	Regenerating well after autumn fire
2. S of Minyulo Brook	D	Shire Road Reserve	13.8.1991	8	7 young plants in a disturbed area
3. Walyering Road	D	Shire Road Reserve	27.8.1992	12	Weed infestation on W side, some plants partly dead
4a. N of Minyulo Road	D	Private	20.8.1993	4	Regenerating well from rootstocks after rolling
4b. N of Minyulo Road	D	Private	20.8.1993	100+	Healthy
5. Minyulo Road	D	Shire Road Reserve	5.8.1992	4	Healthy, but on very narrow road verge, weed infestation
6. Moora-Caro Road	D	Shire Road Reserve	5.8.1992	14	Undisturbed

**Response to Disturbance**

Young plants have been noted in a disturbed area and the species has been observed to regenerate from both rootstocks and seed recruitment following an April fire. Plants were observed to be partly dead in an area of dense weed infestation, while nearby plants that were free from weeds remained healthy.

## Management Requirements

- Ensure that dieback hygiene procedures are carried out at all populations.
- All populations on road verges require weed control.
- Population 4 on cleared private land has been fenced but needs rehabilitation of associated vegetation and weed control.
- Population 4b on uncleared private land requires fencing.
- Population on water reserve and all road verge populations require weed control.
- Monitor all populations annually.
- Maintain liaison with private land owners and the local government authority.
- Acquisition of the water reserve as a nature reserve will improve the conservation status of the species.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.

## Research Requirements

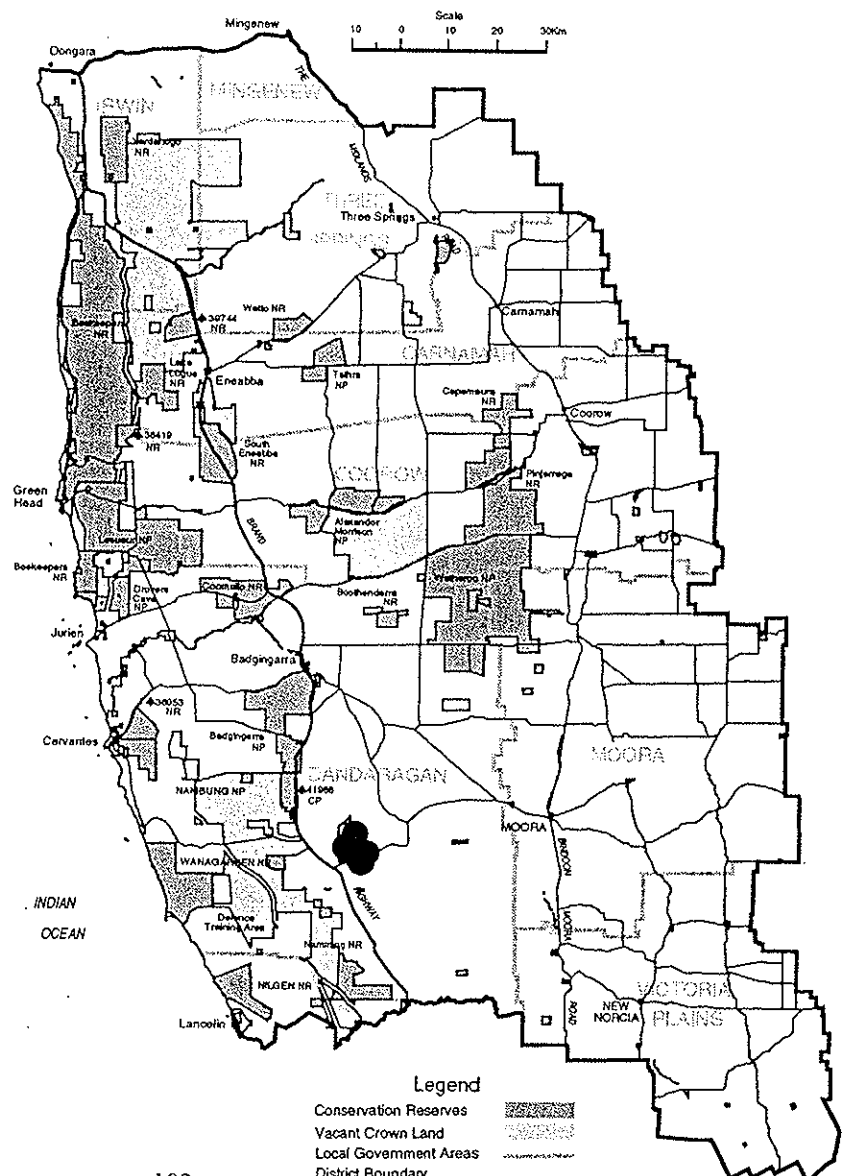
- Further survey is required in suitable habitat.
- The species has been in cultivation for several years but requires seed and cutting collection according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium to maintain genetic diversity.
- Research is required into the susceptibility of the species to dieback.
- Continue to monitor the fire response of the species at population 1.

## References

Makinson and Olde (1991).



● *Grevillea calliantha*





## *Grevillea christineae* McGill.

PROTEACEAE

Christine's Grevillea

A rounded shrub to 1 m tall, with flexuose, wiry branches, and narrow-obovate to linear leaves, which are up to 6 cm x 0.6 cm, with margins loosely rolled back and with a pointed tip. The flowers are in short clusters, either terminal or in the axils of the leaves and ca. 1.5 cm long. The flowers are creamy-white in colour, the perianth hairy on the outside, ca. 3 mm long. The style is reddish, ca. 0.7 cm long, hairless except for the apex, where it is strongly curved. The ovary is hairless. The fruit is oblong, ca. 1.5 cm long, with faint longitudinal ribs.

This species is similar to *Grevillea costata*, which has strongly ribbed fruit, leaves hairy on the lower surface and larger white flowers. Research on the population biology of this species is being undertaken as part of the work for a Ph.D. thesis.

**Flowering Period:** July-early September

### **Distribution and Habitat in the Moora District**

Known from six populations in the Moora District in the Watheroo area over a range of ca. 12 km. The species also occurs in the Merredin District where it is known from one population (population 1) ca. 140 km further to the south-west, near Goomalling. It grows in open low woodland of *Eucalyptus loxophleba* and *E. wandoo* over open tall shrubs including *Allocasuarina campestris*, *Melaleuca radula*, *Acacia acuminata* and with species of *Drosera* and *Tribonanthes* in grey or red-brown sandy clay loams with granite or laterite, usually in moist areas, near drainage lines or outcropping granite.

### **Conservation Status**

Current: Declared Rare Flora

### **Populations Known in the Moora District**

---

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
2. NW of Watheroo	Mo	MRWA Road Reserve	28.8.1992	100+	Healthy, but weed infestation in part of population
3. SE of Watheroo	Mo	Shire Road Reserve	22.8.1991	11 & 10	Narrow verge, weed infested and disturbed
4. NE of Watheroo	Mo	Shire Road Reserve	17.8.1993	1	Dense weed infestation
5. NE of Watheroo	Mo	Private	17.8.1993	23 & 100+	Healthy, population fenced

---

### **Response to Disturbance**

Plants at population 3 have survived on narrow, weed infested road verges and are almost the only surviving representatives of natural vegetation.

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

Presumed susceptible

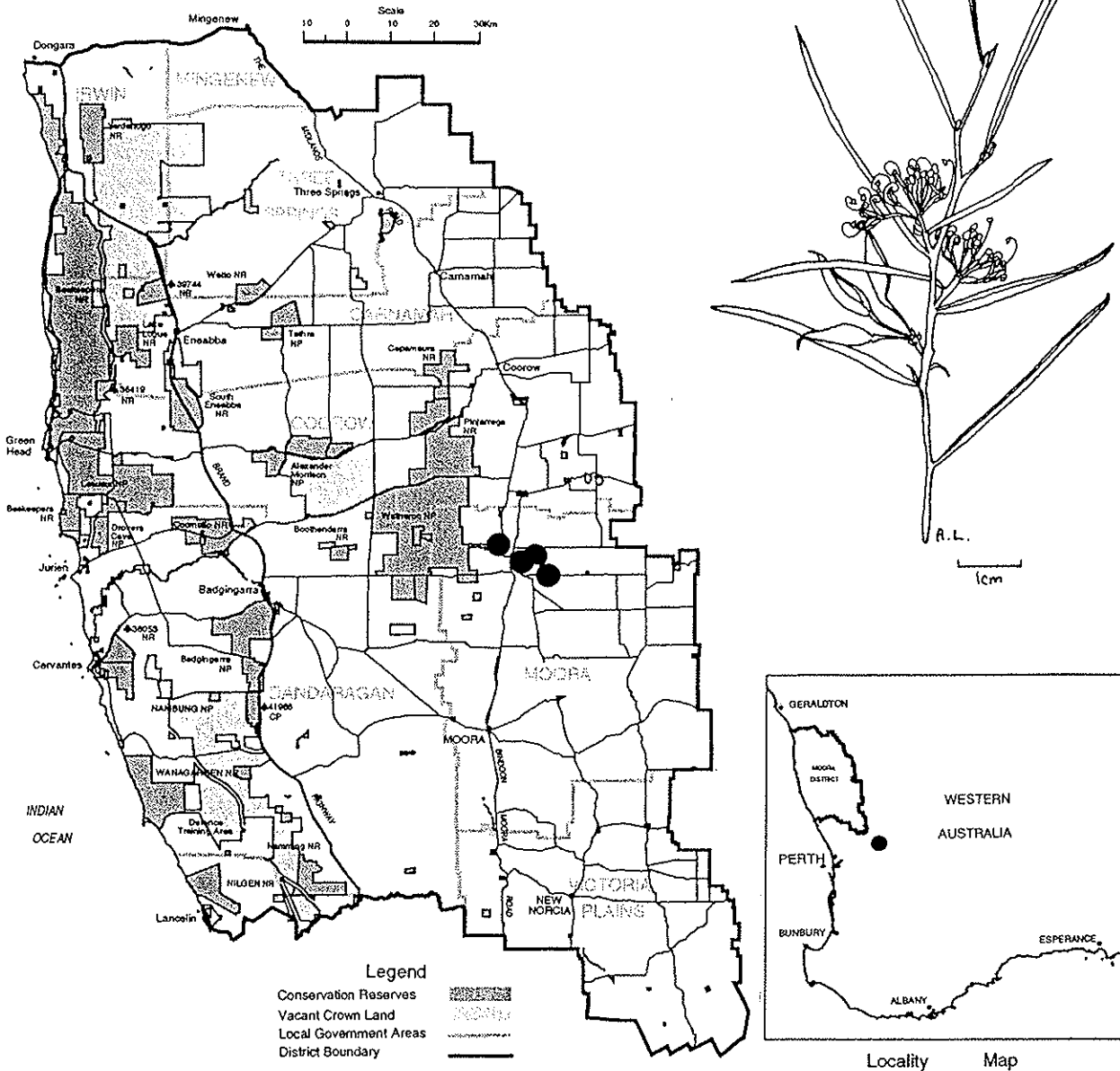
- Monitor populations regularly, particularly those on road verges.
- Maintain liaison with landowners and managers.
- Investigate possibility of land acquisition or change in vesting of reserve at population 1 (Merredin District).
- Protect from frequent fire, where possible, until fire response has been investigated.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

**Research Requirements**

- Further survey is required, particularly on reserves with suitable habitat throughout the known range of the species, and in remnant vegetation in the northern part of the range.
- Investigate the fire response of the species.

**References**

McGillivray (1993), Olde (1986).



● *Grevillea christineae*

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

PROTEACEAE

Pythara Grevillea

A low, upright shrub to 30 cm tall, producing plants from root suckers. The leaves are simple, villous, linear to narrow-elliptic, with recurved margins and a pointed apex. They are grey-green in colour, 7-16 mm long, 1.5-4 mm wide, crowded and sessile. The flower heads are erect, terminal and sessile, with 4-8 flowers. Each flower has a pedicel 4-8 mm long, and the perianth is about 10 mm long, 5 mm wide, red in colour with black bordering the dilated section of the dorsal tepals below the limb. It is sparsely hairy on the outside and bearded within. The anthers are yellow. The style is 20-22 mm long, sparsely hairy, curved and red in colour. The fruits have not been seen.

This species appears to have no close relatives although it is thought that there is possibility of a relationship with species related to *Grevillea saccata*. It is thought that the populations are reproducing by suckers from a single parent rootstock, as no fruits have been seen since the population was first observed and an examination of misshapen anthers found no pollen and no pollen was found on the pollen presenters.

Due to its critically threatened status, an Interim Recovery Plan has been written for this species by CALM.

**Flowering Period:** July-October

### **Distribution and Habitat in the Moora District**

*G. pythara* is a recently discovered species which occurs just outside the eastern boundary of the Moora District. It is known from one population occurring in three discrete groups of plants over less than 1 km of narrow, weed infested road verge to the south-west of Dalwallinu with a total of less than 300 plants. The species is endangered by weed infestation of its habitat, and by low numbers. It is possible that other populations could occur in suitable habitat to the west in the Moora District, but as the area is heavily cleared for agriculture, and as the species has not been collected until the recent discovery of this population, this is unlikely. It grows in brown loamy sand with gravel on a west facing slope, in relict open scrub over introduced weed species. Associated species include *Grevillea* sp., *Actinostrobilus arenarius*, *Conospermum stoechadis*, *Dampiera* sp. and *Keraudrenia integrifolia*.

### **Conservation Status**

Current: Declared Rare Flora

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Dalwallinu	Da	Shire Road Reserve	15.9.1994	69 & 200+ or possibly 2 clones	Some plants grazed, population weed infested

### **Response to Disturbance**

Unknown, but the population occurs in a severely degraded area and is heavily weed infested.

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

Presumed susceptible

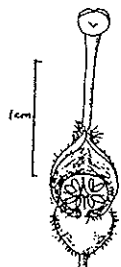
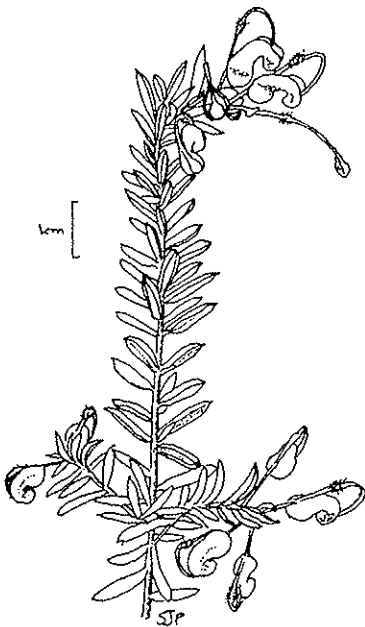
- The population requires rehabilitation of associated vegetation.
- Part of the population requires fencing to prevent further grazing during stock movement.
- It would be desirable to purchase an area of private land adjacent to the known populations to increase the size of the extremely narrow road side area.
- Maintain liaison with landowners and land managers.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Monitor the population frequently.
- Collect germplasm material according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium for long term storage.

**Research Requirements**

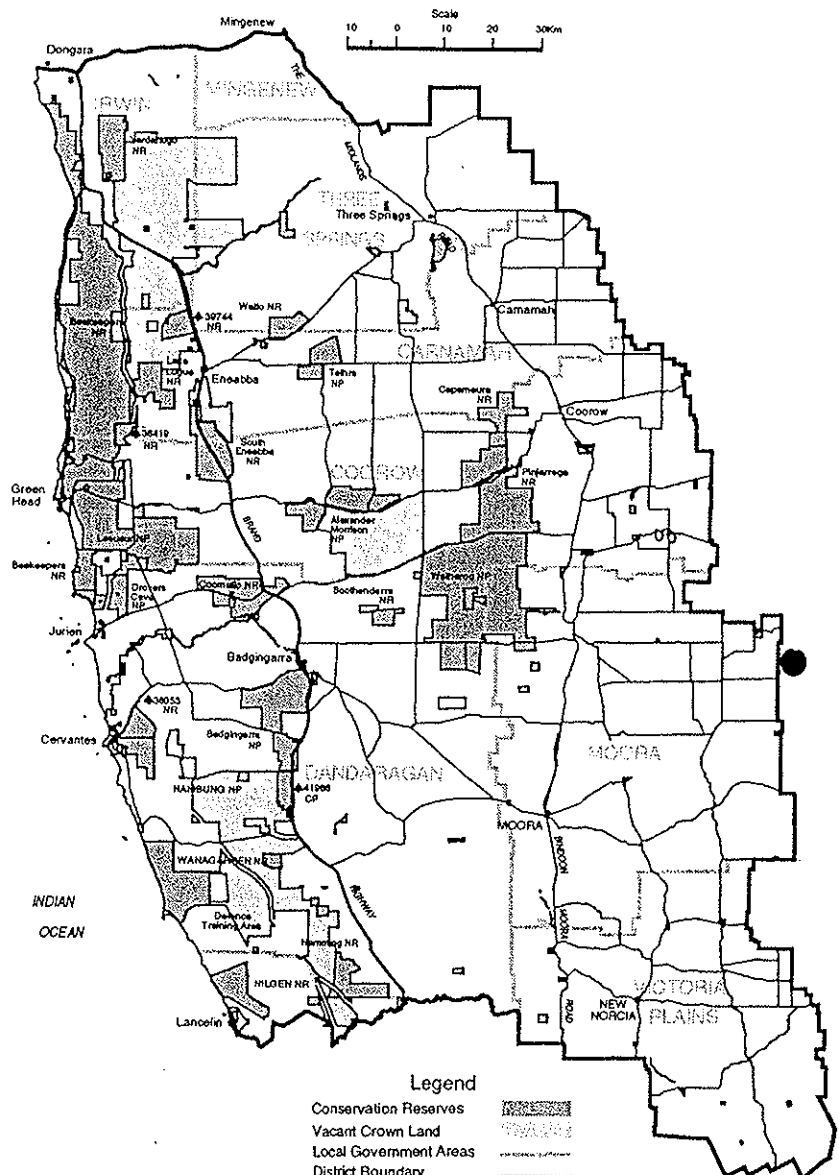
- Research is required into the population biology of the species. The plants are probably reproducing by suckers and further research is required to determine whether the plants are sterile.
- Further survey is required in suitable habitat to find further populations.
- Re-establish plants in suitable habitat in a conservation reserve.
- Conduct research on the fire response of the species.

**References**

Olde and Marriott (1993).



● *Grevillea pythara*



## *Hakea megalosperma* Meisn.

PROTEACEAE

Lesueur Hakea

James Drummond first collected this species in about 1850 from the Lesueur area. It was described by Meissner in 1855. The specific name refers to the large fruits. *Hakea megalosperma* is an erect to spreading, multistemmed shrub to 1.3 m high and 2 m across. The leaves are thick, flat, obovate-oblong in shape, with blunt tips and tapering to the short stalks, 4-10 cm long, and up to 4 cm broad. They are a distinctive pale green in colour, with faint veins. The flowers are whitish-pink, darkening to deep red with age, hairless and grouped in small, axillary clusters of 5-10 flowers, which have a sweet perfume. Each flower is ca. 0.5 cm long, on a long stalk. The style has a disc-shaped pollen presenter. The fruit are large, 5-7 cm long and 3-4 cm broad, each valve with an apical beak. The seed is surrounded by a broad, papery wing.

This species may be confused with *H. incrassata*, which has more pointed leaves and smaller, more rounded fruits.

**Flowering Period:** April-June

### Distribution and Habitat in the Moora District

*H. megalosperma* occurs in the Lesueur area, and eastwards for ca. 35 km with an occurrence ca. 65 km further south to the west of Dandaragan. An isolated small population is reported from south-east of Eneabba.

Grows in low heath in grey sand and lateritic gravel or laterite boulders on hilltops and ridges, or occasionally with emergent *Eucalyptus tottiana* in white or yellow grey sand. Associated species include *Banksia candolleana*, *B. micrantha*, *Lambertia multiflora*, *Hakea obliqua*, *Adenanthos cygnorum*, *Allocasuarina humilis*, *Stirlingia* sp. and *Dryandra* species.

### Conservation Status

Current: Declared Rare Flora

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Coomallo	D	Nature Reserve	13.3.1993	200+	Undisturbed
2. N of Warradarge	Co	Nature Reserve	9.12.1992	37 & 17	Partly disturbed
3. Alexander Morrison	Co	National Park	6.8.1992	2 & 40, 1, 21, 10+, 2, 2, 6, (100+ E.A.Griffin)	3a, 3e, 3g, 3f, 3h undisturbed, 3b, 3c, 3d not found in 1991
4. Mt Lesueur	D	National Park	1.1989	100+	-
5. Coomallo	Co	MRWA Road Reserve	27.9.1985	18	Good
6. W of Dandaragan	D	Shire Road Reserve, Private	6a 30.4.1991 6b 20.7.1986	29 & 6	Partly disturbed & healthy
7. E of Mt Lesueur	D	National Park	9.10.1991	200 est. (1000+ in 1989)	Undisturbed
8. N of Mt Lesueur	D	National Park	1.1989	30 est.	-
9. Mt Michaud	D	National Park	1.1989	10 est.	-
10. E of Mt Michaud	D	National Park	28.2.1991	100+	Undisturbed
11.*SE of Eneabba	Ca	Govt. Requirements Reserve	1992	12 est.	-
1. NW of Coomaloo	-	Private	-	20-30	File reference, not confirmed
2. Coomallo	D	Nature Reserve	3.6.1988	15	Healthy

### Response to Disturbance

Regeneration has been reported to occur by resprouting following fire, and from underground lignotubers following damage.

### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

### Management Requirements

- Ensure that dieback hygiene procedures are carried out at all populations.
- Maintain liaison with private landowners and land managers of land on which the populations occur.
- Monitor populations at regular intervals.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

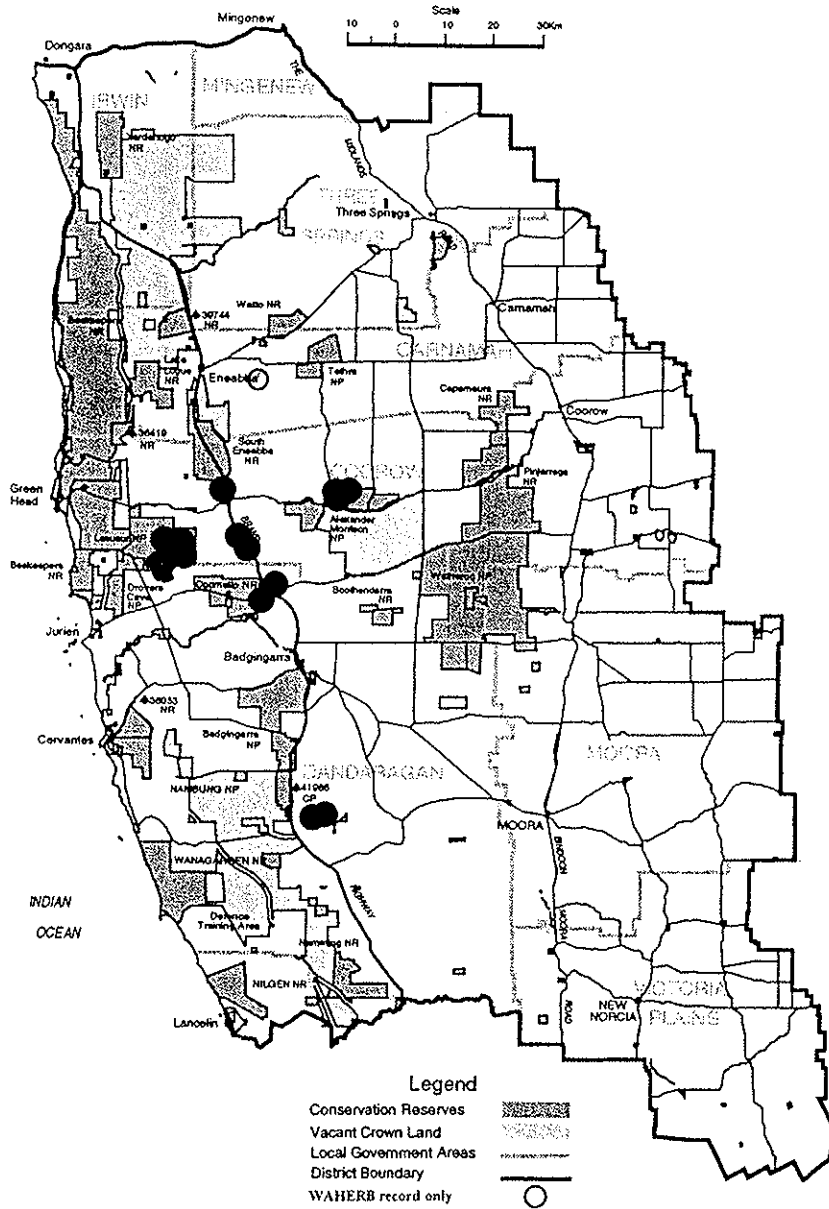
### Research Requirements

- Resurvey populations 1, 3b-d, 11, 12 and 13, collect voucher specimens for the Western Australian Herbarium collections, and obtain Global Positioning System readings for the locations.
- Conduct research on the susceptibility of the species to dieback (*Phytophthora* species) and fire response.

### References

Bentham (1870), Blackall and Grieve (1988), Rye and Hopper (1981).





● *Hakea megalosperma*

## *Hemiandra gardneri* O.H.Sarg.

LAMIACEAE

Red Snakebush

*Hemiandra gardneri* was collected by C.A. Gardner from near Watheroo in 1926 and described from those specimens by O. Sargent in 1927.

It is a prostrate, perennial shrub forming a mat to 10 cm high, which may reach a diameter of 2 m. The primary stems are usually up to 40 cm long. It has grey-green leaves, which are almost obovate with pungent points and three raised veins on the lower surface. The leaves and calyx are covered with short hairs which give the leaves a grey appearance, although a few plants in some populations may have green leaves. The leaves are up to 20 x 5 mm, linear to linear oblanceolate with a pungent point. The calyx is bell-shaped and two-lipped, 5 mm long, the upper lip with small lateral lobes, and all the lobes are acute. The flowers are dark red to orange-red in colour, the corolla tube is 14 mm long, with the equal stamens inserted in the tube and the anthers protruding a short way from the mouth of the corolla. This species was at first thought to be a variety of *H. pungens*, but is distinguished by the velvety indumentum, shortly exerted anthers and characters of the corolla.

An Interim Recovery Plan has been written for the species by CALM and is currently being implemented.

**Flowering Period:** September-January

### Distribution and Habitat in the Moora District

Known from five populations between Watheroo and Gunyidi, with a sixth ca. 10 km further east and another ca. 35 km to the north-west. The species has also been collected in 1959 from Wubin, which is 30 km further east in the Merredin District. A specimen identified as this species has also been collected from the Lesueur area, but grew on lateritic soils and requires further study. *H. gardneri* grows in deep yellow to yellow-white sand on sandplains and hills in the more open areas of open low woodland over low scrub, low heath or dwarf scrub with *Banksia prionotes*, *B. attenuata*, *Xylomelum angustifolium*, *Conospermum stoechadis*, *Grevillea integrifolia*, *G. amplexans*, *Leptospermum erubescens*, *Jacksonia eremodendron*, *Actinostrobos pyramidalis* and *Verticordia* species. In 1983 when a survey for the species was commenced, it was known from two sites, south of Gunyidi and north of Watheroo, and was classified as endangered (Leigh *et al.* 1981), having a range of over 100 km, occurring in small populations restricted to highly specific habitats. Elsewhere it was classified as occurring in localities less than 100 km apart (Marchant and Keighery 1979, Rye 1980). As a result of the survey, *H. gardneri* was found to occur to the north and north-east of Watheroo, in six populations, with a total of 2,206 plants, mainly on a railway reserve, some on private land and a few on road verges.

### Conservation Status

Current: Declared Rare Flora

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Watheroo	Mo	Road Verge & Rail Reserve	29.6.1994	1 (8 in 1982)	Area disturbed and degraded
2. SW of Gunyidi	Mo	MRWA Road Reserve, Private	29.6.1994	6 (400+ in 1989 & 769 in 1982)	Many plants dead, possibly senescence, others in poor condition



### Populations Known in the Moora District (Cont'd)

3. N of Watheroo	Mo	Railway Reserve	29.6.1994	1 (100+ in 1992, 1196 in 1982 & 1000+ in 1989)	Plant unhealthy, area badly disturbed
------------------	----	-----------------	-----------	--	--

---

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
4. N of Watheroo	Mo	Railway Reserve	30.6.1994	6 (222 in 1982)	Plants healthy but area disturbed
5. SE of Gunyidi	Co	Shire Road Reserve, Private	19.11.1982	7	Two plants in poor condition, the remainder good
6. SW of Coorow	Ca	Shire Road Reserve	15.11.1990	1	Undisturbed
1.* Cockleshell Gully	D	?National Park	8.10.1978	-	Lateritic soil

---

### Response to Disturbance

Seedlings appear to compete poorly with mid-dense or dense native vegetation and are found mainly on disturbed or cleared sand.

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

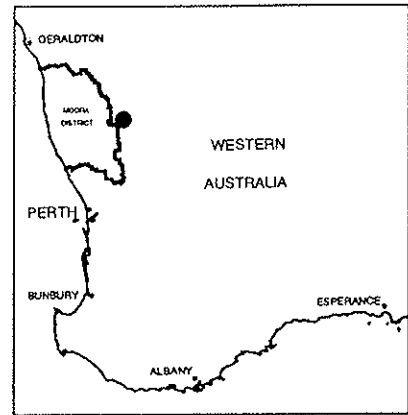
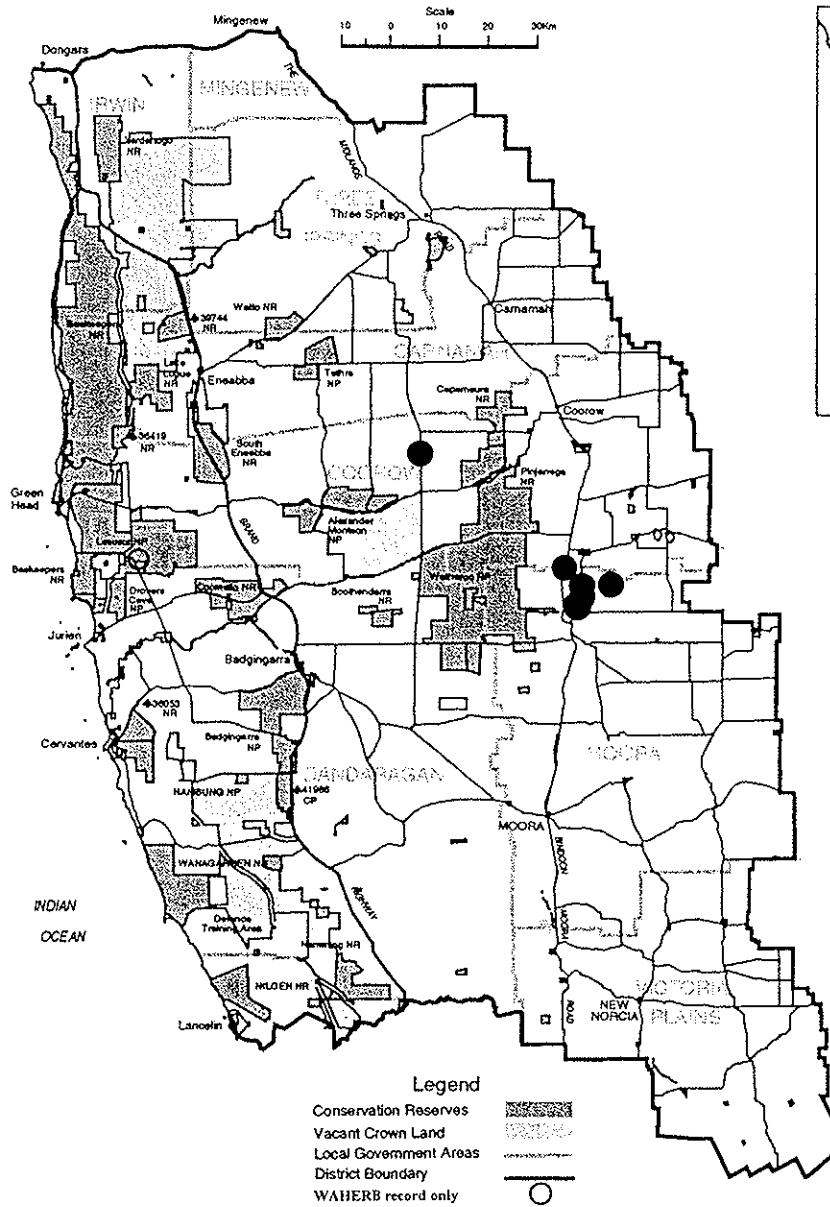
- Maintain liaison with land owners and land managers.
- Monitor populations annually.
- Ensure that markers are present at all road verge and rail reserve populations.
- Investigate the possibility of land acquisition at population 2.
- Monitor all populations for weed invasion and control if necessary.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Fence population 2 on private land to protect from grazing.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### Research Requirements

- Further survey for new populations in conservation reserves throughout the range, and resurvey populations 4 and 5 and obtain Global Positioning System readings.
- Conduct research on the population biology of the species and its fire response.
- Investigate the possibility of establishment in a conservation reserve.
- Taxonomic research is required for the herbarium specimens for populations 6 and 7.
- Conduct research on the susceptibility of this species to *Phytophthora* species.

### References

Blackall and Grieve (1981), Burgman (1983), B. Conn (personal communication), Leigh *et al.* (1981), Marchant and Keighery (1979), Rye (1980), Sargent (1927).



Locality Map

● *Hemiandra gardneri*



## *Hemiandra* sp. Watheroo (S.Hancocks 4)

LAMIACEAE

(now *H. hancocksiana* ms)

Colourful Snakebush

In 1983 a species of *Hemiandra* was collected from several populations in the Watheroo area. These had come to the attention of the horticulturalist B. Jack and the species was thought to be *H. rutilans*. However, B. Conn during his revisionary taxonomic study of the genus *Hemiandra* has more recently found that this is an undescribed species.

It is an erect shrub to 0.5 m, with leaves, calyx and stems having small curved hairs, which may be dense, giving the plant a grey appearance. The leaves are ovate to linear, with a pungent point and raised veins on the lower surface. They are 9-17 mm long. The calyx is two-lipped, the upper lobe entire, the lower being divided into two lobes. The flower colour is variable, ranging though red, pink, mauve, and yellow, the colour being consistent in individual plants, but may vary within a population. The anthers are almost equal.

An Interim Recovery Plan has been written for this species by CALM and is currently being implemented.

**Flowering Period:** October-January

### Distribution and Habitat in the Moora District

Has been recorded in the Moora District over a geographical range of ca. 35 km to the west of Coorow. Grows in disturbed areas in white-grey sand on flat ground, the slopes of ridges or low hills in open low woodland with open scrub beneath. Associated species include *Eucalyptus todtiana*, *Banksia attenuata*, *B. prionotes*, *Hakea obliqua*, *Xylomelum angustifolium* and *Eremaea* sp.

### Conservation Status

Current: Declared Rare Flora

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Brand Mudge Road	Ca	Private	15.11.1990	0 (50 est. in 1983)	Disturbed
2. Carnamah-Eneabba Road	Ca	MRWA Road Reserve, Private	15.11.1990	0 (12 in 1983)	-
3. Brand Mudge Road	Ca	Reserve for the use and benefit of aborigines	7.1.1992	0 (1 in 1990), (50+ in 1983)	Reserve grazed by sheep
4. Brand Mudge Road S of Hughes Road	Ca	Shire Road Reserve, Private	15.11.1990	0 (1 in 1983)	-
5. Hughes Road	Ca	Private	15.11.1990	0 (1 in 1983)	Little native vegetation, heavy weed infestation
6. Hughes Road	Ca	Shire Road Reserve, Private	15.11.1990	0 (8 in 1983)	-
7. Alexander Morrison	Co	National Park	20.11.1992	2 (27 in 1987)	Plants at edge of firebreak
1.* SW corner of Watheroo National Park	D	National Park	5.10.1971	-	- /

### **Response to Disturbance**

Most populations occurred on the disturbed soil of firebreaks or cleared areas and have declined since discovery; most previously recorded locations no longer have plants present. The species is likely to be short-lived with populations persisting for long periods as seed stored in the soil.

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

Unknown

### **Management Requirements**

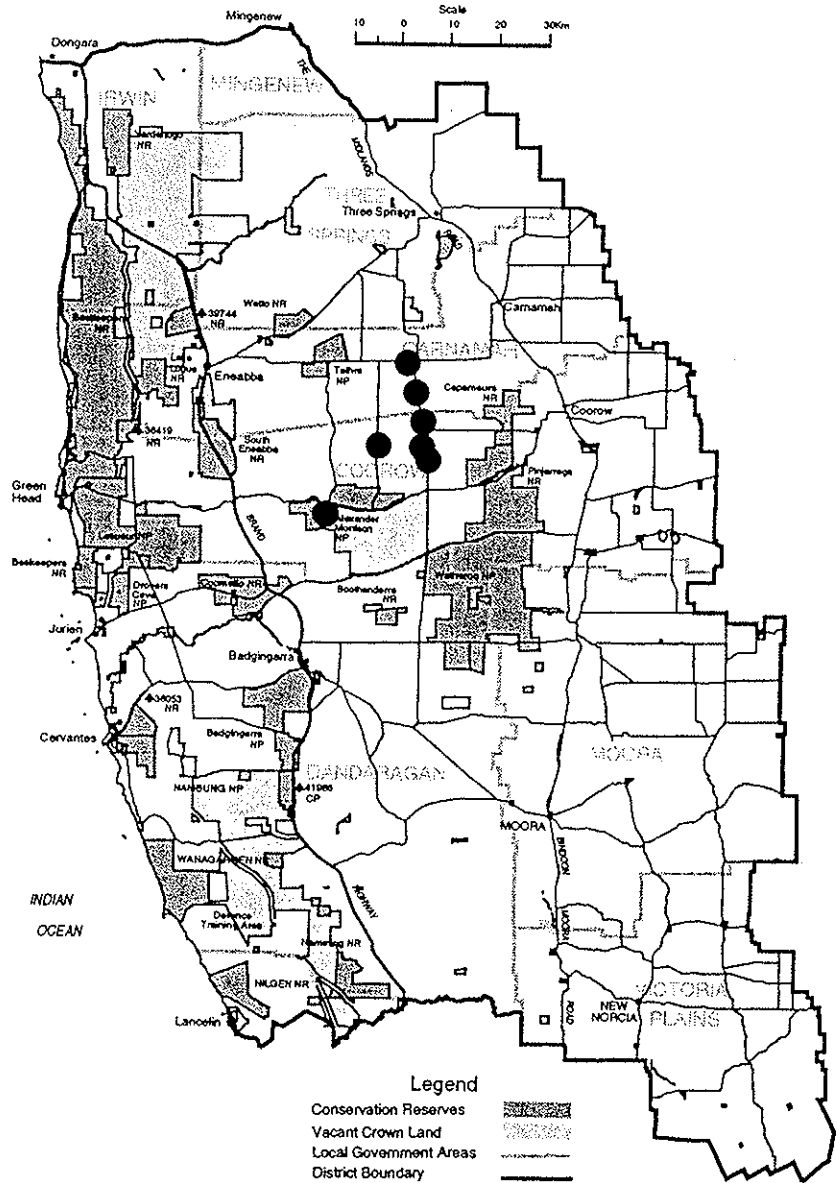
- Monitor populations regularly, particularly after fire or soil disturbance.
- Maintain liaison with land owners and managers.
- Ensure that markers are present at all road verge populations.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.
- Conduct research on the susceptibility of this species to *Phytophthora* species.

### **Research Requirements**

- Determine when the area of the most westerly population was last burnt.
- Set up monitoring quadrats on the sites of the larger populations and conduct trials into the effect of disturbance and fire.
- Conduct further survey in suitable habitats particularly in Alexander Morrison National Park and make efforts to re-find population 8 in Watheroo National Park.
- Conduct taxonomic study on the herbarium specimen on which population 8 is based, which was originally identified as *H. rutilans*, to determine its identity. Also re-identify material collected by E.A. Griffin from between Moora and Dandaragan, originally identified as *H. rutilans*, to determine whether it is this taxon.

### **References**

B. Conn (personal communication).



● *Hemiandra* sp. Watheroo (S.Hancocks 4)



## *Hensmania chapmanii* Keighery

## ANTHERICACEAE

Chapman's Hensmania

A tufted perennial plant, with rhizomes. The leaves are 3 mm or more in diameter, terete with brown or transparent sheathing bases, and are 24-38 cm long. The inflorescence is a terminal umbel, 35-50 mm long, ca. 8 mm wide, on a stalk which is shorter than the leaves, and which is covered with sharply pointed, pale brown bracts. The flower head is surrounded by fawn pointed bracts, which hide the insignificant flowers. In this species the bracts are all sharply pointed including the inner ones, and the bracteoles are not divided into fine hairs. The cream perianth of the flower is united in a tube in the lower third, and divided into six equal segments in the upper part.

*Hensmania chapmanii* is similar in appearance to other species of *Hensmania*, but is distinguished from them by the large leaves, the shape of the inner bracts on the flower head, which are not sharply pointed and by the entire bracteoles surrounding the flowers, which have fringed margins but are not divided into fine hairs.

**Flowering Period:** December-January

**Fruiting Period:** February-March

### Distribution and Habitat in the Moora District

This species is known from three localities to the south-west of Three Springs and Carnamah over a range of 30 km. It grows in open low woodland of *Eucalyptus tottiana* and *Banksia* species with scrub and heath beneath, or in tall shrubland on low ridges or hill slopes in yellow sand. Associated species include *B. prionotes*, *Xylomelum angustifolium*, *Actinostrobos arenarius* and *Verticordia* species.

### Conservation Status

Current: Declared Rare Flora

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Carnamah	Co	Private	8.1.1992	3000+	Undisturbed, some plants dead, ? senescence
2. Dookanooka	TS	Shire Road Reserve, Reserve for the use and benefit of Aborigines	18.8.1993	250+	Undisturbed, plants on the north verge in poor condition
1.* SW of Carnamah	Ca	Road Reserve	30.10.1982	-	-
1. SW of Three Springs	TS	Shire Road Reserve	27.1.1994	20+	Some plants in disturbed areas

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

- Maintain liaison with landowners and managers.
- Ensure that markers are in place at population 2.
- Establish liaison with the landowners on which population 1 is located, to ensure the future conservation of the population.
- Monitor populations regularly.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Investigate the possibility of land acquisition to conserve the species.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

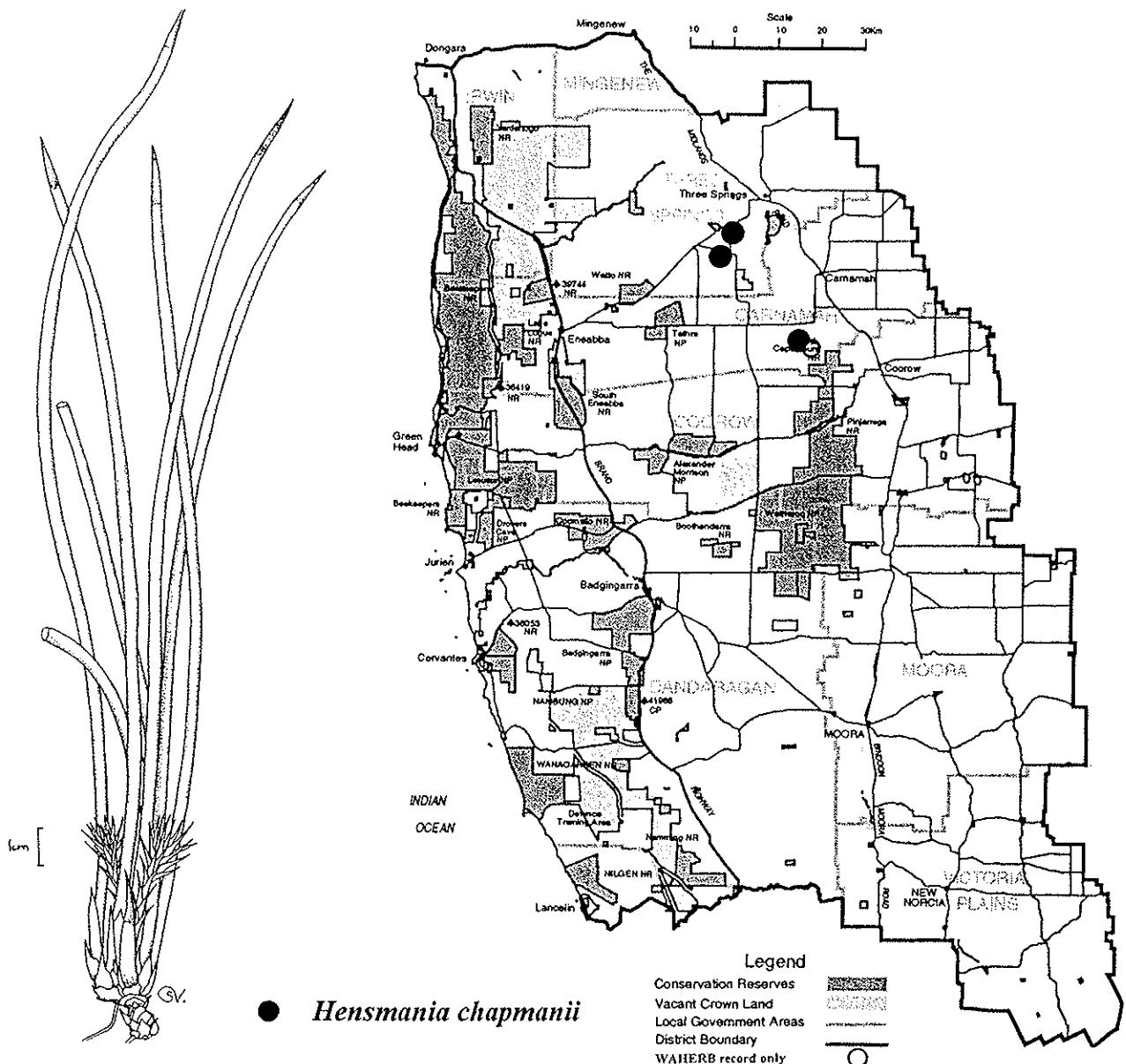
### Research Requirements

- Further survey is required, particularly to refind population 3 and the full extent southwards of population 2.
- Carry out research of the fire response and population biology of the species.
- Conduct research on the susceptibility of this species to *Phytophthora* species.

### References

Dixon and Keighery (1992), Keighery (1987).

Drawing by Catherine Vasiliu



● *Hensmania chapmanii*

*Leucopogon obiectus* Benth.

## EPACRIDACEAE

Hidden Beard-heath

This species was recollected in 1978 for the first time since its original collection by James Drummond last century.

*Leucopogon obiectus* is an erect, open shrub to ca. 1.5 m tall. The leaves are stalkless, and are broad, almost heart-shaped and overlapping, concealing the stem. They are rigid and concave with a short point, and finely lined, to ca. 1 cm long and 1 cm wide, pale blue-green in colour. There are 2-3 creamy-yellow flowers on very short stalks in each leaf axil, just visible above the top of the leaf. Each flower has five petals, united to form a tube towards the base, and with five lobes spreading outwards to show the dense hairs on the inner surface. The five stamens alternate with the petals and are without sterile tips. The fruit is green, smooth, ovoid in shape and single seeded.

**Flowering Period:** October-March

**Distribution and Habitat in the Moora District**

Occurs to the north-west and south-east of Eneabba over a range of ca. 25 km. There is also a report of the species from ca. 30 km further to the south-east, where two plants were found in 1987. These were not refound during the present survey. *L. obiectus* grows mainly on the crests and upper slopes of sand dunes, or in interdunal swales, in open heath or low, open heath, where it occurs in open, scattered populations, the plants growing emergent from the heath. The soil is grey-white or pale yellow sand. A survey of this species in 1981 found 25 populations with a total of 108 plants (Lewis 1981). However, two of the populations accounted for nearly half the total and many populations were of only one plant. Much of the habitat of this species has been used for mineral sand mining. A joint project between Kings Park and Botanic Garden and sandmining companies investigated methods of propagation of the species for re-introduction into rehabilitation sites. In 1989 a reserve to the north-west of Eneabba was gazetted for the purpose of conservation of flora and fauna, within which eleven populations of the species are protected.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. NNW of Eneabba	Ca	Nature Reserve, VCL (Mining Lease)	30.4.1992	9	Undisturbed
2. NNW of Eneabba	Ca	MRWA Road Reserve	15.7.1981	2	Not refound 2.7.1992
3. N of Eneabba	Ca	Nature Reserve	4.6.1981	1	Healthy
4. N of Eneabba	Ca	Nature Reserve	28.8.1982	4	In regenerating vegetation
5. N of Eneabba	Ca	Nature Reserve	4.6.1981	2	Healthy
6. NNW of Eneabba	Ca	Nature Reserve	4.6.1981	5	Healthy
7. NNW of Eneabba	Ca	Nature Reserve	3.6.1981	1	Healthy
8. NNW of Eneabba	Ca	Nature Reserve	12.5.1981	11	Healthy
9. NNW of Eneabba	Ca	Nature Reserve	12.5.1981	5	Healthy
10. NNW of Eneabba	Ca	Nature Reserve	3.6.1981	2	Healthy
11. NNW of Eneabba	Ca	Nature Reserve	3.6.1981	3	Healthy
12. NNW of Eneabba	Ca	VCL	3.6.1981	5	Healthy
13. NNW of Eneabba	Ca	VCL	3.6.1981	3	Healthy



### Populations Known in the Moora District (Cont'd)

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
14. NNW of Eneabba	Ca	Nature Reserve, VCL	3.6.1981	2	Healthy
15. NW of Eneabba	Ca	VCL (Mining Lease)	20.6.1981	1	Poor
16. WNW of Eneabba	Ca	VCL (Mining Lease)	20.6.1981	2	Healthy
17. S of Eneabba	Ca	Nature Reserve, VCL (Mining Lease)	8.1988	1 (5 in 1981)	4 dead
18. S of Eneabba	Ca	VCL (Mining Lease)	10.1982	15	-
19. S of Eneabba	Ca	VCL (Mining Lease)	21.6.1981	32	Healthy
20. S of Eneabba	Ca	Nature Reserve	21.6.1981	6	Healthy
21. S of Eneabba	Ca	Nature Reserve	21.6.1981	1	Healthy
22. S of Eneabba	Ca	Nature Reserve	21.6.1981	3	Healthy
23. Alexander Morrison	Co	National Park	1987	1	Not refound 1991
24. S of Eneabba	Ca	Nature Reserve	4.7.1981	0	Plants not relocated
25. S of Eneabba	Ca	Nature Reserve	4.7.1981	1	Healthy
26. Alexander Morrison	Co	National Park	1987	1	Not refound 1991
27. NW of Eneabba	Ca	VCL	8.1.1992	1	Healthy
28. NW of Eneabba	Ca	VCL	8.1.1992	14	Healthy
29. NW of Eneabba	Ca	VCL	8.1.1992	4	Healthy
30. NW of Eneabba	Ca	VCL	8.1.1992	3	Healthy
31. SSE of Eneabba	Ca	VCL (Mining Lease)	7.1.1992	24	Good, in rehabilitation area
32. S of Skipper Road	Ca	MRWA Road Reserve	19.8.1993	2	Undisturbed
33. NNW of Eneabba	Ca	Nature Reserve	10.3.1995	12	Undisturbed
34. NW of Eneabba	Ca	VCL	27.2.1995	1	Seedling, undisturbed

#### Response to Disturbance

The plants are thought to be short-lived, being killed by fire, regenerating from seed.

#### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

#### Management Requirements

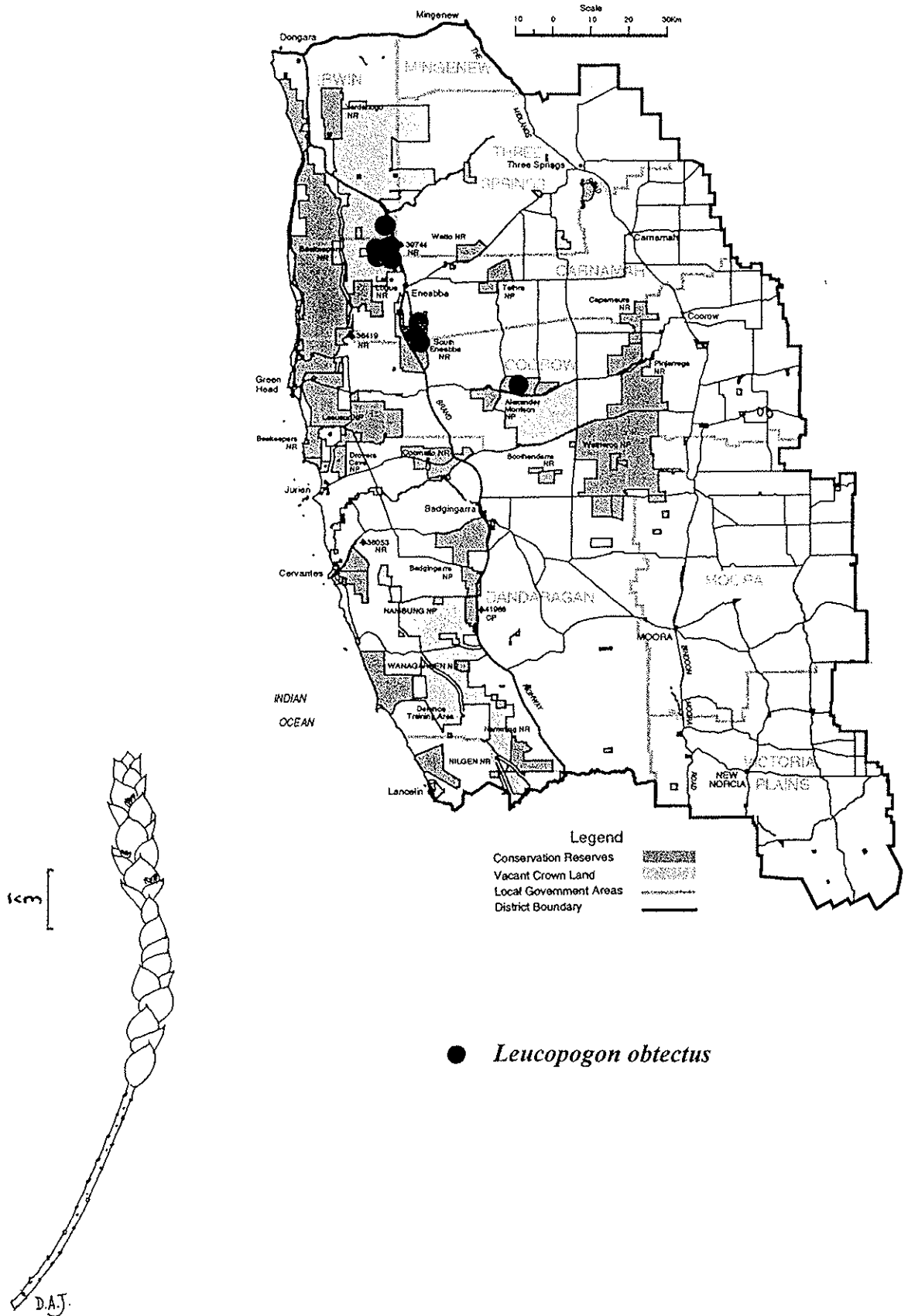
- Ensure that dieback hygiene procedures are carried out at all populations.
- Maintain liaison with managers of land on which the populations occur.
- Monitor populations regularly.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.
- Conduct research on the fire response of the species.

#### Research Requirements

- All populations should be revisited and plotted accurately.
- Monitor population densities after any fires to determine response to fire.

References

Bentham (1869), Blackall and Grieve (1981), Lewis (1981), Rye and Hopper (1981).



*Paracaleana dixonii* Hopper & A.P.Brown ms

ORCHIDACEAE

Sandplain Duck Orchid

*Paracaleana dixonii* ms is a rare species that flowers much later than other associated orchids, often on a withered leaf that has dried up due to hot early summer soil temperatures. *P. dixonii* ms has the longest labellum and one of the tallest scapes of the Western Australian members of the genus. It differs from its nearest relative, *P. triens*, in its longer narrower linear leaf (20-30 mm by 4-6 mm), its thicker scape 13-18 cm tall, its longer labellum lamina (12-14 mm), and its paler colouration.

**Flowering Period:** October-January. *P. triens* flowers well into December.

**Distribution and Habitat in the Moora District**

Known from 10 populations in the Moora District from north-east of Eneabba to the Jurien Bay area. Only one population (no. 2) is known outside the Moora District in the Perth District. The species can be found in either deep sand in open areas beneath dense tall shrubs with scattered emergent banksias, or in heathland in shallow sand over laterite.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1a & 1b. E of Lake Indoon	Ca	Nature Reserve	21.10.1992	0 (14 found in 1987)	Not refound in 1992
3. N of Eneabba	TS	VCL or ?Private	30.11.1993	6	Healthy, area burnt summer 1993
4. N of Eneabba	TS	VCL	30.11.1993	3	Healthy, area burnt summer 1993
5. N of Eneabba	TS	VCL	30.11.1993	6	Healthy, area burnt summer 1993
6. N of Eneabba	TS	VCL	25.11.1993	15	Healthy, area burnt summer 1993
7. N of Eneabba	TS	VCL	25.11.1993	10	Healthy, area burnt summer 1993
8. N of Eneabba	TS	VCL	25.11.1993	29	Healthy, area burnt summer 1993
9. N of Eneabba	TS	VCL	25.11.1993	15	Healthy, area burnt summer 1993
10.* NE of Nylagarda	D	Nature Reserve	25.11.1979	-	-
11. Cockleshell Gully	D	?National Park	6.11.1985	-	-

**Response to Disturbance**

Fire appears to play an important part in the flowering of this species, which flowers far more profusely following summer fire. However, it is thought that burning may be detrimental if it occurs during the growing period of the plants (May-early December).

**Susceptibility to *Phytophthora* Dieback**

Unknown, but thought to be low.

## Management Requirements

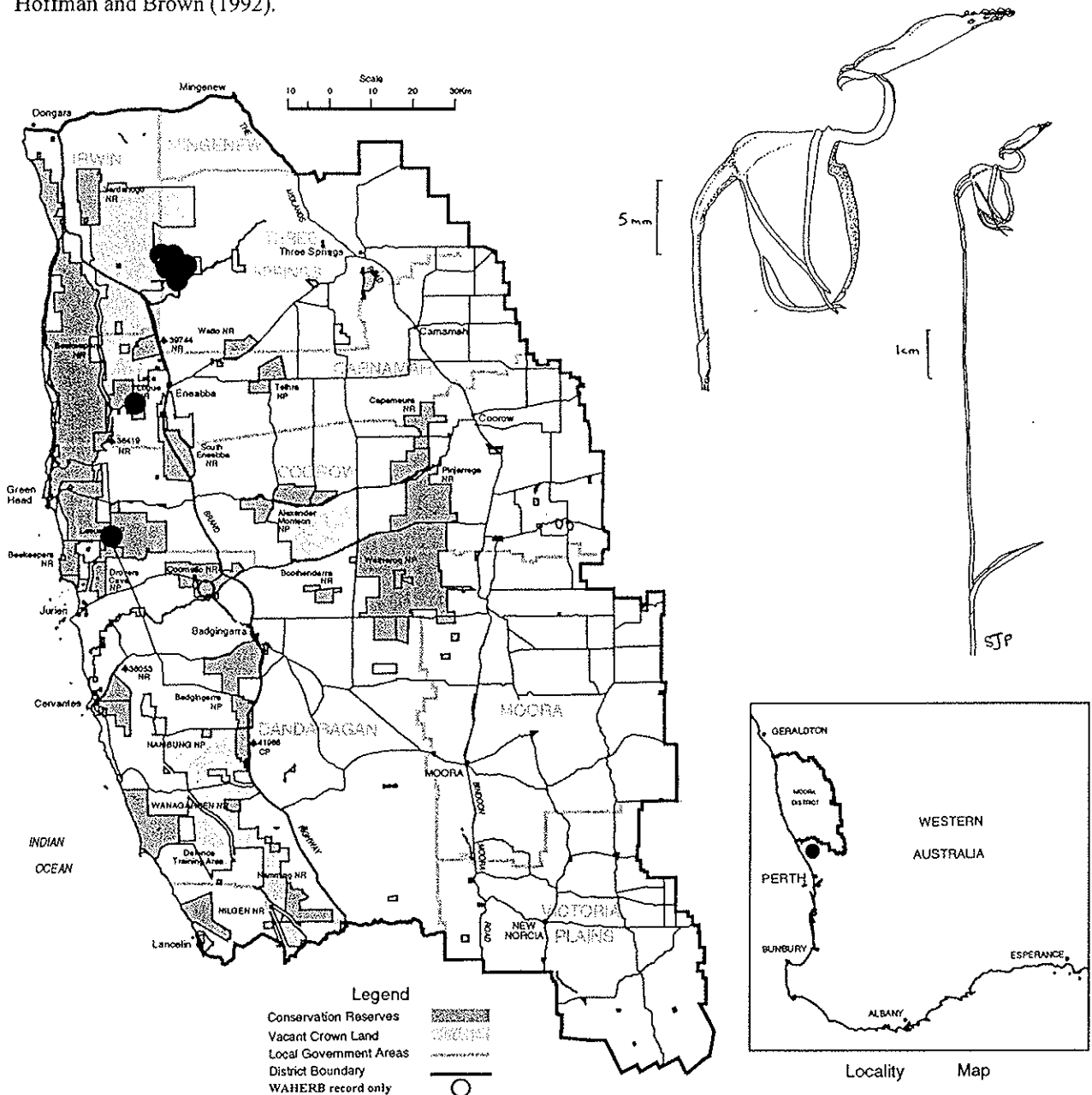
- Continue close liaison with landowners/managers and local authorities.
- Monitor populations regularly to determine their conservation status.
- Protect from fire, where possible, during vegetative/flowering phase of the plants (May-December).
- Investigate change of vesting of the land on which populations 4-9 occur to enhance conservation status.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

## Research Requirements

- Further surveys should be carried out in areas of suitable habitat, particularly in the Eneabba area.
- Conduct research on pollination biology and population ecology.

## References

Hoffman and Brown (1992).



● *Paracaleana dixonii* ms

## *Ptychosema pusillum* Benth.

FABACEAE

Dwarf Pea

*Ptychosema pusillum* was first collected by James Drummond in the early 1800s, with further collections made in 1902 and 1913. It was not collected again until 1971 and despite several surveys of the locality from which it had been collected near Gingin, the population was not re-found until 1986. The discovery of a population in the Moora District in 1992 extended the range of this rare species ca. 50 km further north. It is an erect, herb-like plant to 10 cm tall. The leaves are pinnate, with 5-11, narrow, obovate leaflets, 2-10 mm long and 1-2 mm wide. The flowers are borne singly on long leafless stalks to ca. 6 cm long, and are typical pea flowers. The large standard petal is orange striped with deep red on the upper side, and with a yellow "eye" at the base. The back of this petal is dark brown with yellow stripes. The other petals are dark red. The fruit is a dry, flat pod, containing a few seeds. The flower of this species resembles that of Lambs Poison, *Isotropis cuneifolia*, but the plant differs in its pinnate leaves.

**Flowering Period:** August-November

### **Distribution and Habitat in the Moora District**

This species was known only from one population of ca. 70 plants from north-east of Gingin in the Swan Region (population 1) until 1992 when a large population was found in the south of the Moora District ca. 50 km further north. It has also been collected from the Badgingarra area, which is some 50 km further north, but no further details of the locality have been recorded.

The population within the Moora District grows in open low woodland of *Banksia attenuata*, *B. menziesii* and *Eucalyptus todtiana* over scrub with *Adenanthos cygnorum*, *Eremaea pauciflora*, *Hibbertia hypericoides* and *Eriostemon spicatus*, on the top and upper slopes of a high sand ridge. The plants are found in open areas on grey sand. The southern population grows in banksia-eucalyptus woodland amongst low scrub and herbs, adjacent to a paperbark swamp.

### **Conservation Status**

Current: Declared Rare Flora

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
2. SE of Cataby	D	Road Reserve, Private	20.8.1993	10000+	Healthy
3.* Near Badgingarra	-	-	-	-	-

### **Response to Disturbance**

Unknown. Plants at population 2 were growing in undisturbed woodland and were not present on a firebreak.

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

Presumed susceptible

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at the population.
- Maintain liaison with the landowner and Shire on whose land population 2 occurs, and with companies with mining tenements covering the land on which the population occurs.

- Efforts should be made to acquire the area on which population 2 occurs as a nature reserve, particularly as other rare and poorly known taxa occur there.
- Monitor population regularly.
- Protect from frequent fire, where possible, until the fire response is known.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

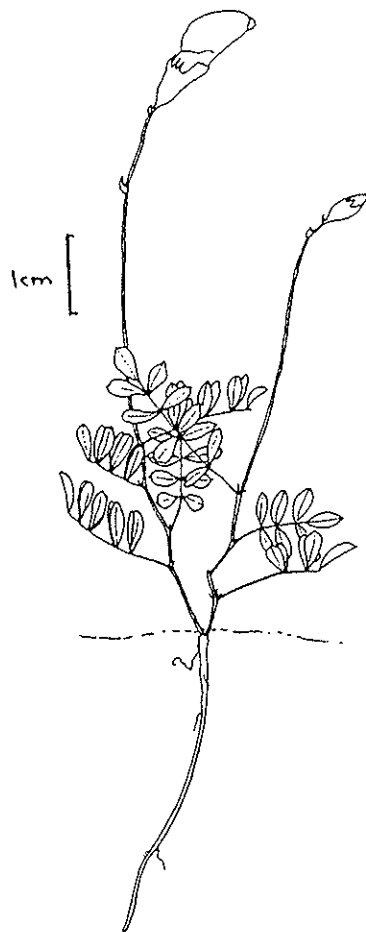
**Research Requirements**

- Further survey is required during the flowering season of this inconspicuous species, particularly in suitable habitat in conservation reserves between Gingin and Badgingarra, and to the north-east of Badgingarra.
- Conduct research on the population biology and fire response of the species.

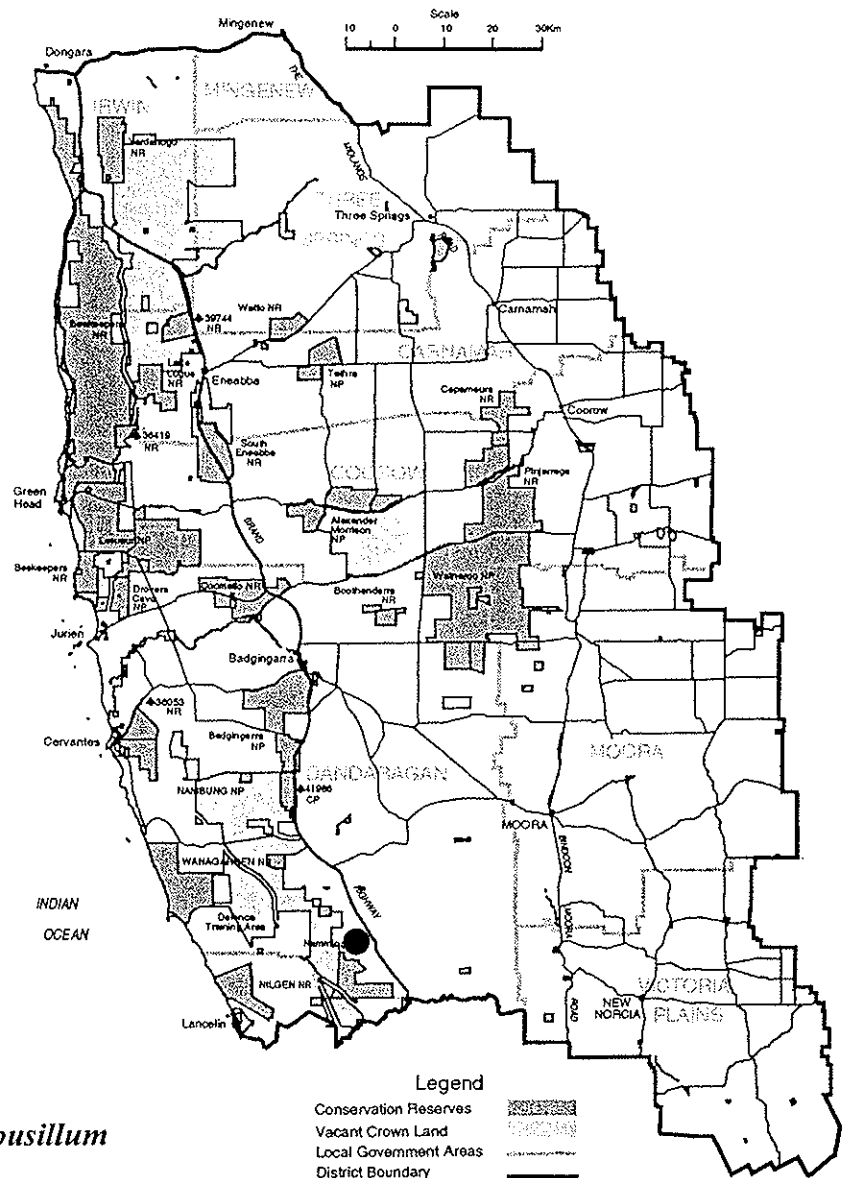
**References**

Bentham (1864), Kelly *et al.* (1990), Lee (1973), Millar (1982), Rye and Hopper (1981).

Illustration by L. Braganca



● *Ptychosema pusillum*



***Restio chaunocoleus* F.Muell.**

RESTIONACEAE

(now *Chordifex*)

Heath Rush

This species was known only from the type collection made by James Drummond in the middle of last century, from which it was described by Mueller in 1873. It was presumed extinct until two populations were found in 1990. One of these was found near Toodyay in the Swan Region, the other in the Moora District. It is an erect, tufted, perennial plant to 80 cm in height. The rhizome is thick, creeping and covered with whitish wool. The stems are hairless, to 0.6 m or more in height, with narrow sheathing scales which are loose above the middle and produced to a point. The branchlets are absent or reduced to less than 5 cm in length. There are numerous spikelets, in clusters of 3-5 in the uppermost nodes. Male and female spikelets are on separate plants and are narrow. The male spikelets are up to ca. 4 mm long, numerous in a terminal interrupted spike. The female spikelets are fewer, to ca. 8 mm long, containing 2 or 3 flowers.

**Flowering Period:** August-September

**Distribution and Habitat in the Moora District**

This species is known from one population of 500+ plants on road verge and private land in the Swan Region near Toodyay and from two other populations of ca. 11,000 plants in total near Badgingarra which is ca. 160 km to the north-west in the Moora District. It occurs in siliceous sands in the southern population. Near Badgingarra it grows in deep sand, in low, moist drainage lines between lateritic hills, in shrubland with *Banksia attenuata*, *B. menziesii*, *Adenanthos cygnorum*, *Eucalyptus todtiana* and *Macrozamia riedlei*.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
2. W of Badgingarra	D	National Park, Shire Road Reserve	30.5.1994	1000+	Healthy
3. W of Badgingarra	D	National Park, Shire Road Reserve	30.5.1994	10000+	Healthy

**Response to Disturbance**

The plants are seeder species and are therefore susceptible to elimination by frequent fire.

**Susceptibility to *Phytophthora* Dieback**

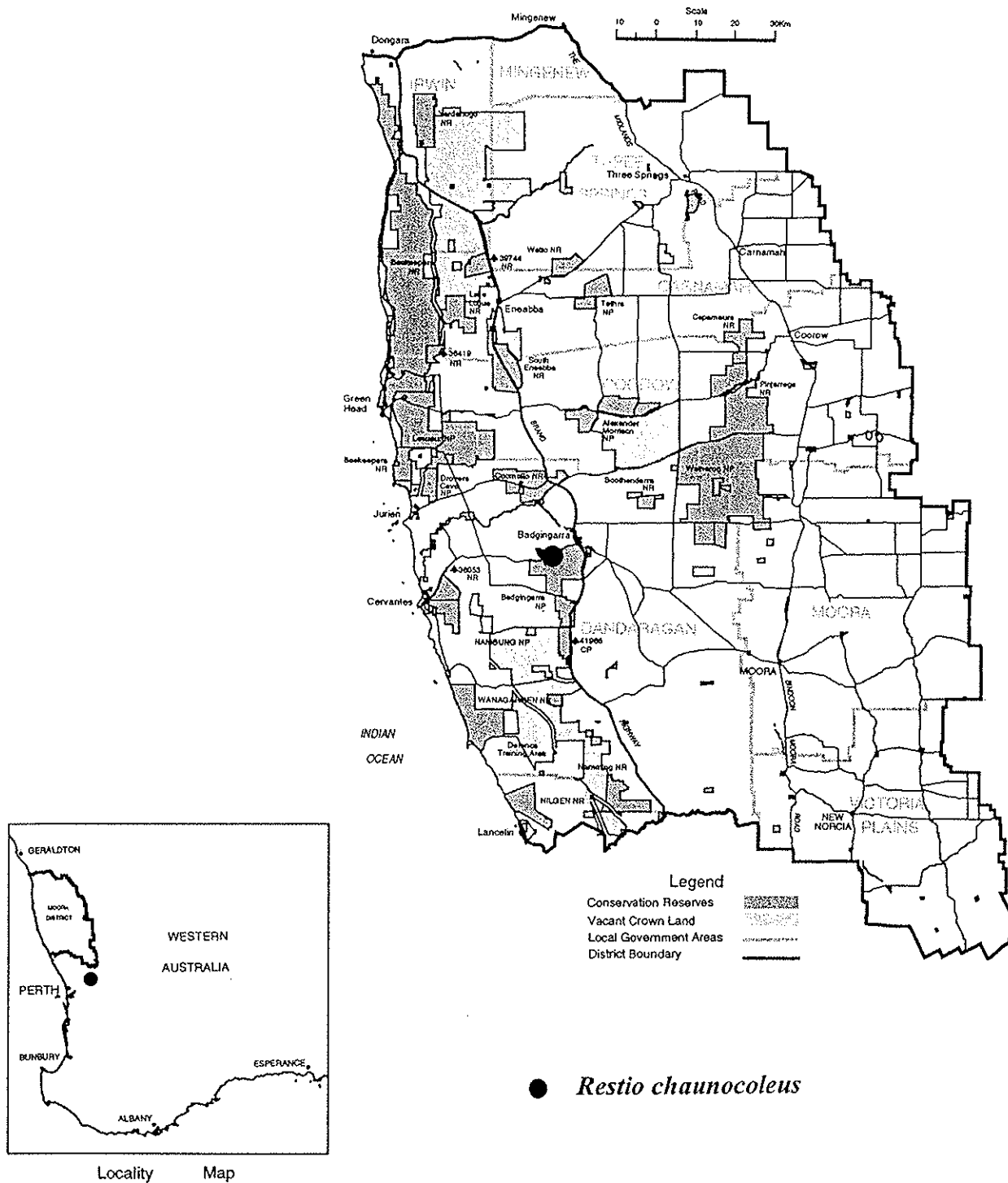
Unknown

## Research Requirements

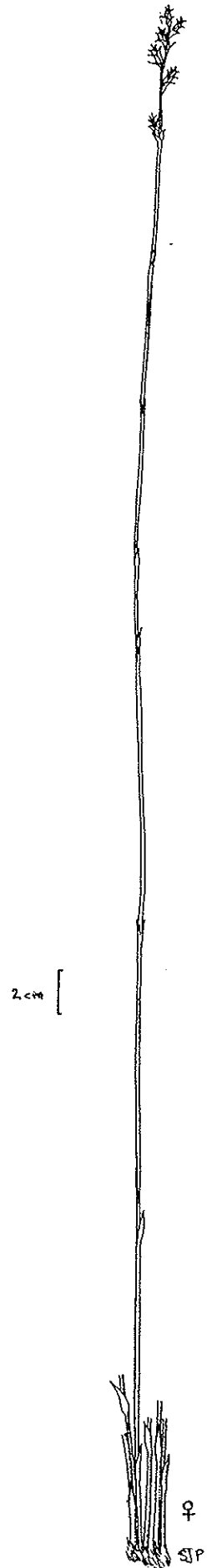
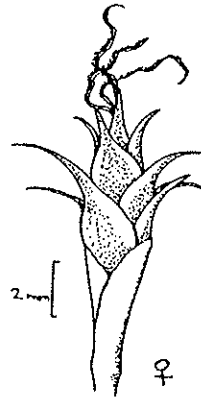
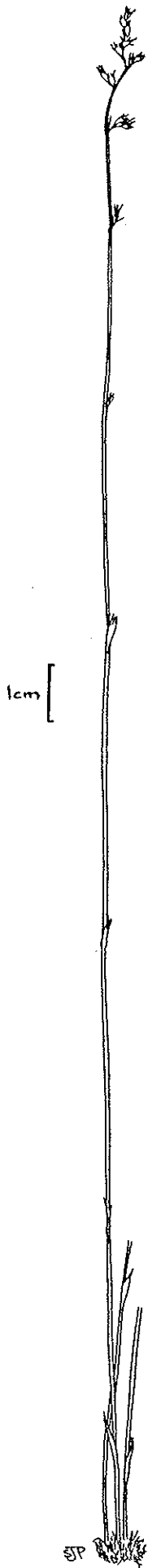
- Further survey is required particularly in suitable habitat in the Badgingarra National Park and to the south of that area.

## References

Bentham (1878), K. Meney (personal communication), Mueller (1873), Patrick (1985).







*Restio chaunocoleus*

## *Spirogardnera rubescens* Stauffer

## SANTALACEAE

### Spiral Bush

This leafless, semi-parasitic shrub is the only species in the genus, and was named in honour of Charles Gardner, who showed the plant to Hans Stauffer when he visited Western Australia in 1963. He recognised it as a new genus and subsequently named it.

*Spirogardnera rubescens* is an erect, open plant to 1.6 m tall, with succulent, light green flowering branches which twist in a spiral shape. There are reddish bracts on these stalks up to 0.4 cm long and the flowers are arranged in sessile clusters each with four flowers and up to ca. 20 clusters along each stalk. The flowers are ca. 0.2 cm long, with five perianth lobes, white on the outside and yellow-green with fine hairs on the inside. There are five stamens opposite the petals. The fruit is stalkless and succulent, surrounded by the persistent perianth segments, which become dark red with age.

**Flowering Period:** August-November

### Distribution and Habitat in the Moora District

*S. rubescens* is known from two disjunct areas ca. 100 km apart. It was collected originally from east of Wannamal in 1962, but was not refound there until 1988. It is known from this area of the Swan Region from three populations. In the Moora District the species is known from four populations in an area over 12 km, to the north of Badgingarra. It has also been recorded from 20 km further south but this population was not refound during the survey. The area in which it occurred has since been burnt and possibly the population has been destroyed.

In the Moora District this species grows in brown loam and laterite on hill slopes or in grey loam over yellow clay loam in tall heath and open mallee scrub with *Eucalyptus eudesmioides* and *E. wandoo*. It also grows in clayey sand over laterite in drainage lines and low areas. In the Wannamal area it grows in brown loam and lateritic gravel or in granitic soil in open low woodland with *E. wandoo* and *Santalum acuminatum*.

### Conservation Status

Current: Declared Rare Flora

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
2a. Tootbardie Road	Co	Shire Road Reserve	14.8.1991	5 (250 est. in 1987)	Undisturbed
2b. Alexander Morrison	Co	National Park	14.8.1991	7	Undisturbed, 9 plants in 1987, 2 in firebreak ? now destroyed
4. Marchagee-Coomallo Road	D	Shire Road Reserve	14.8.1991	8 (30+ plants 1986)	Undisturbed, some plants on road shoulder
5. Marchagee-Coomallo Road	D	Shire Road Reserve	14.8.1991	1	Undisturbed
6.* Badgingarra	D	National Park	9.9.1979	20 est.	Not refound 15.8.1991
8. Tootbardie Road	Co	Shire Road Reserve	15.7.1986	150	-

### **Response to Disturbance**

Appears to be killed by fire. Some plants at population 2 were established on the shoulder of the road with others in undisturbed vegetation on the road verge.

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

Unknown

### **Management Requirements**

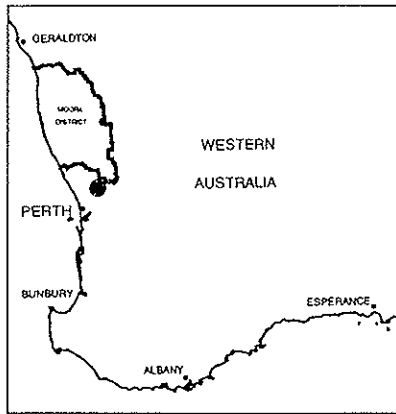
- Maintain liaison with local government authorities with road verge populations.
- Inspect all populations regularly.
- Ensure that markers are in place at populations 2 and 8.
- Protect from frequent fire, where possible, until research has been conducted on the fire response of the species.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.
- Conduct research on the susceptibility of this species to *Phytophthora* species.

### **Research Requirements**

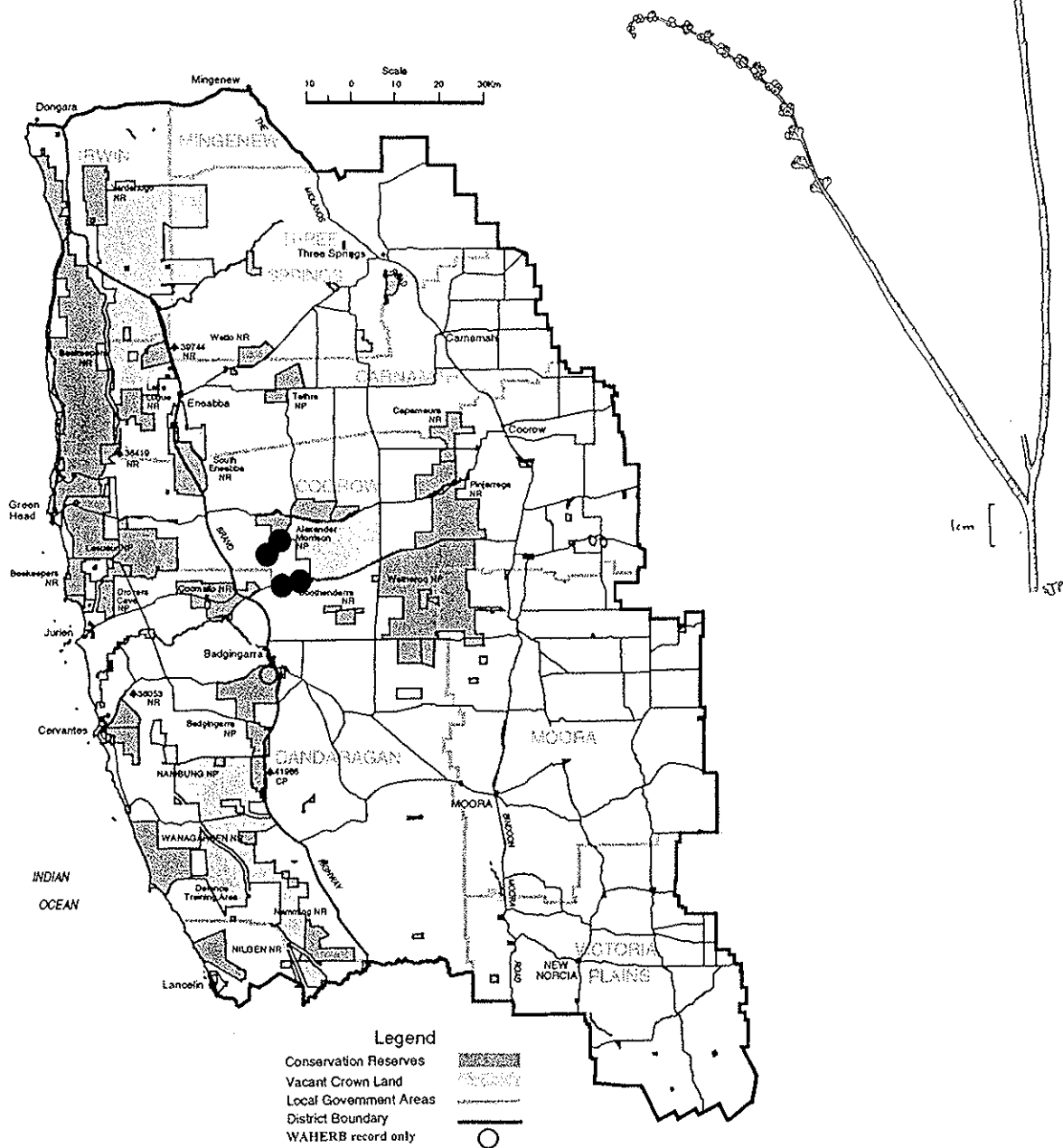
- Survey population 8, check number of plants now present and collect voucher specimen for collections of Western Australian Herbarium.
- Investigate fire response and population biology of the species.

### **References**

Kelly *et al.* (1990), Leigh *et al.* (1984), Rye and Hopper (1981), Stauffer (1968).



Locality Map



● *Spirogardnera rubescens*

## *Stawellia dimorphantha* F.Muell.

## ANTHERICACEAE

Arrowsmith Stilt-lily

This species was described in 1870 from specimens collected by Drummond, but has been collected only a few times since then. It is a perennial plant to 20 cm tall, with terete, ribbed leaves and fibrous roots. The stems are numerous, 2-4 cm long, with stilt roots at the nodes, forming dense clumps to 30 cm in diameter. The leaves are few, to 4.5 cm long, terminal from just below the inflorescence and surrounding it. The flowers are small, grouped 10-20 in condensed globular spikes, 3-4 mm wide and surrounded by overlapping, dry, membranous bracts. Each flower is 4-5 mm long, pale purple or cream, with six perianth lobes, three stamens and a superior ovary. The fruit is a grey capsule ca. 0.15 cm long, containing seeds which are black and shiny, kidney-shaped with a prominent aril, and probably dispersed by ants.

**Flowering Period:** June-December

### Distribution and Habitat in the Moora District

*Stawellia dimorphantha* is endemic to the Moora District where it occurs over a narrow range from Eneabba northwards. A population noted in 1975 has not been refound recently, but as the species is most noticeable a few years after fire it may still be present in the area. Although known at present from one locality the species has been recorded in the past over a range of ca. 45 km. It grows on open areas of sand in open low banksia woodland with *Nuytsia floribunda*, *Banksia prionotes*, *B. attenuata* and *Xylomelum angustifolium*, with scrub beneath including *Acacia saligna* and *Hakea trifurcata*. Associated species include *Anthocercis littorea* (in recently burnt areas), *Verticordia grandis*, *Conospermum stoechadis* and *Lechenaultia linarioides*. At the known location it grows in deep yellow sand in a flat depression between sand ridges. The plants become more open and spreading in shaded situations.

### Conservation Status

Current: Declared Rare Flora

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Arrowsmith	I	MRWA Road Reserve, VCL	19.11.1992	1000+ mature 9000+ seedlings	Part of the population burnt ca. 18 months previously, some weed invasion in unburnt area
1.* E of Eneabba	Ca	-	17.6.1975	-	Not refound 19.11.1992
2.* S of Dongara	I	-	29.11.1965	-	-

### Response to Disturbance

The plants are killed by fire, with good regeneration from seed, the young plants flowering two years after a burn. The species also grows in disturbed areas, such as the windrows of disturbed topsoil along the edges of firebreaks, but persists in vegetation unburnt for 15 years or more.

### Susceptibility to *Phytophthora* Dieback

Unknown

- Weed control on road verges where necessary.
- Change vesting of VCL to nature reserve to protect the population.
- Ensure that dieback hygiene procedures are carried out at the population.
- Implement appropriate fire regime.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

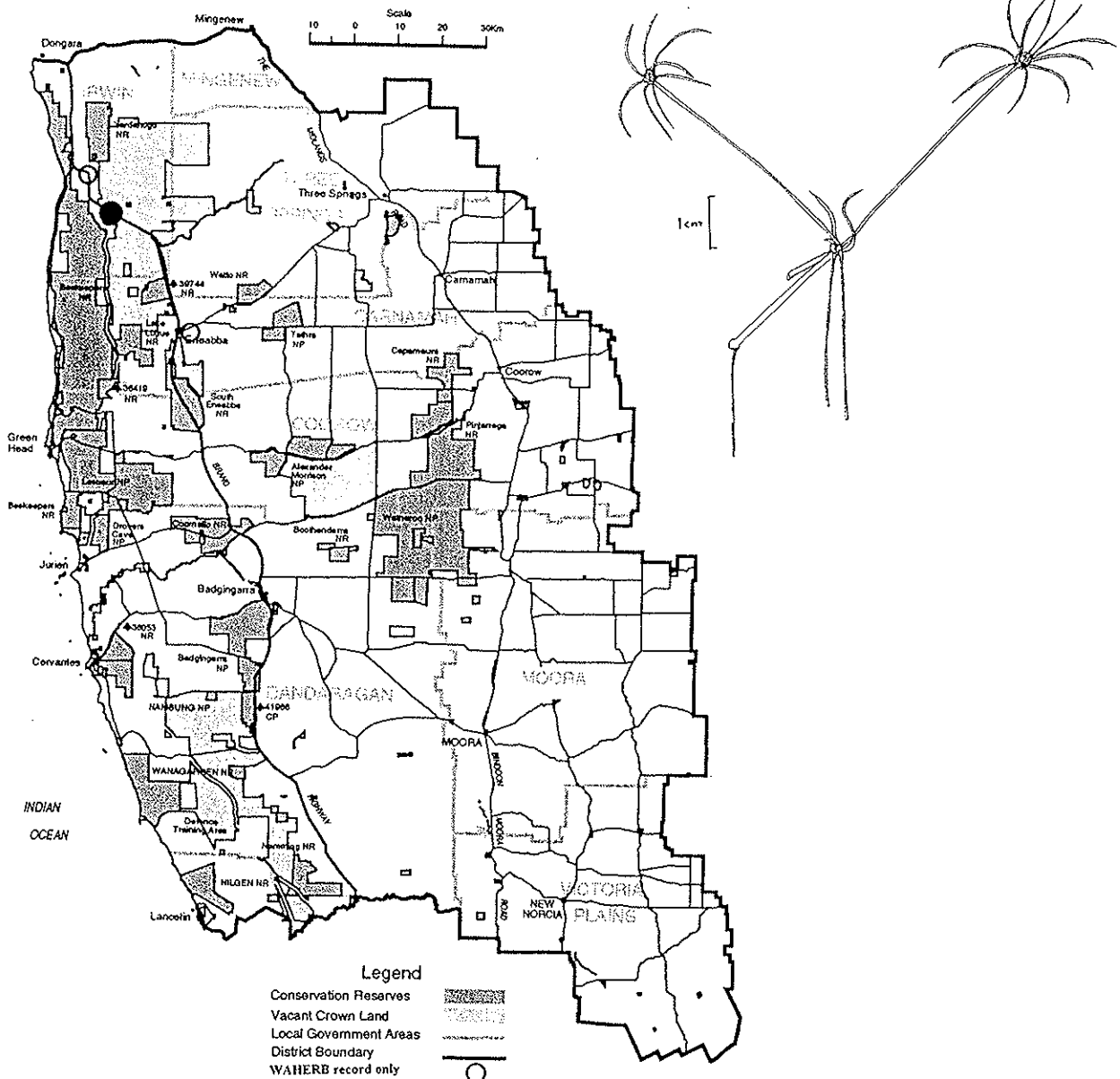
### Research Requirements

- Requires further survey, particularly in recently burnt areas of conservation areas, in suitable habitat within and around its known range. Further effort should also be made to refind populations 2 and 3.
- Conduct research on the susceptibility of this species to *Phytophthora* species.

### References

Bentham (1878), Dixon and Keighery (1992), Keighery (1987), Mueller (1870), Rye and Hopper (1981).

Illustrated by G.J. Keighery.



● *Stawellia dimorphantha*

## *Stylidium scabridum* Lindl.

## STYLIDIACEAE

Moth Triggerplant

*Stylidium scabridum* was described by Lindley in 1839 from specimens collected by James Drummond. A low plant to 20 cm tall, with grass-like leaves, in a basal tuft. They are rough, to 6 cm long and 2 mm wide, with pointed tips and rolled margins, the midnerve very broad on the underside. They are interspersed with short, pointed scale leaves. The stalk of the flower head is very glandular hairy and is short, barely longer than the leaves. The flowers are borne in a loose raceme of ca. 12 flowers with the lower flower stalks elongated so that the flowers are held almost on the same level. The calyx is globose and very glandular hairy with five lobes up to three times longer than the tube, three shorter and recurved and two longer and united. The petals are pale pink or whitish with a dark central streak, particularly on the lower surface, and they are paired. The throat of the corolla has six small, inconspicuous appendages and the labellum is small and narrowly triangular. The column is short and white, with black anthers, the stigma small and rounded.

**Flowering Period:** September-October

### Distribution and Habitat in the Moora District

Known in the Moora District from one population south of Calingiri. A population previously known from ca. 8 km north of this is now extinct. The species has also been recorded from the Merredin District in the Tammin area (population 2) and Meckering areas and from the Narrogin District, near Narambeen. All these populations are now extinct and at one time the species was known only from the population in the Moora District and one other small population in the Swan Region north-east of York. However, in October 1994, 5 large populations were discovered in the Swan Region east of Perth and at about the same time two smaller populations were also found in the Merredin District. In the Moora District, *S. scabridum* grows in white sand over laterite in open wandoo woodland, with open scrub of *Dryandra sessilis* with *Grevillea pilulifera*, *Daviesia pedunculata* and *S. caricifolium*. The populations to the east of Perth have been found in white to grey sand in low heath in depressions between low hills supporting open low woodland of *Banksia attenuata*.

### Conservation Status

Current: Declared Rare Flora<sup>#</sup>

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* S of Calingiri	VP	Nature Reserve	19.9.1991	0	Possibly now extinct
3. S of Calingiri	VP	Nature Reserve	9.9.1991	14	Fenced to prevent grazing by rabbits, vehicular disturbance in area

### Response to Disturbance

Unknown. Research on the response of the species to fire is being undertaken in the Swan Region.

### Susceptibility to *Phytophthora* Dieback

Presumed not susceptible

<sup>#</sup> now Priority 4 (updated at December 1999)

**Management Requirements**

- Monitor population regularly
- Protect from frequent fire, where possible, until the fire response of the species is known.
- Ensure that dieback hygiene procedures are carried out at population.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

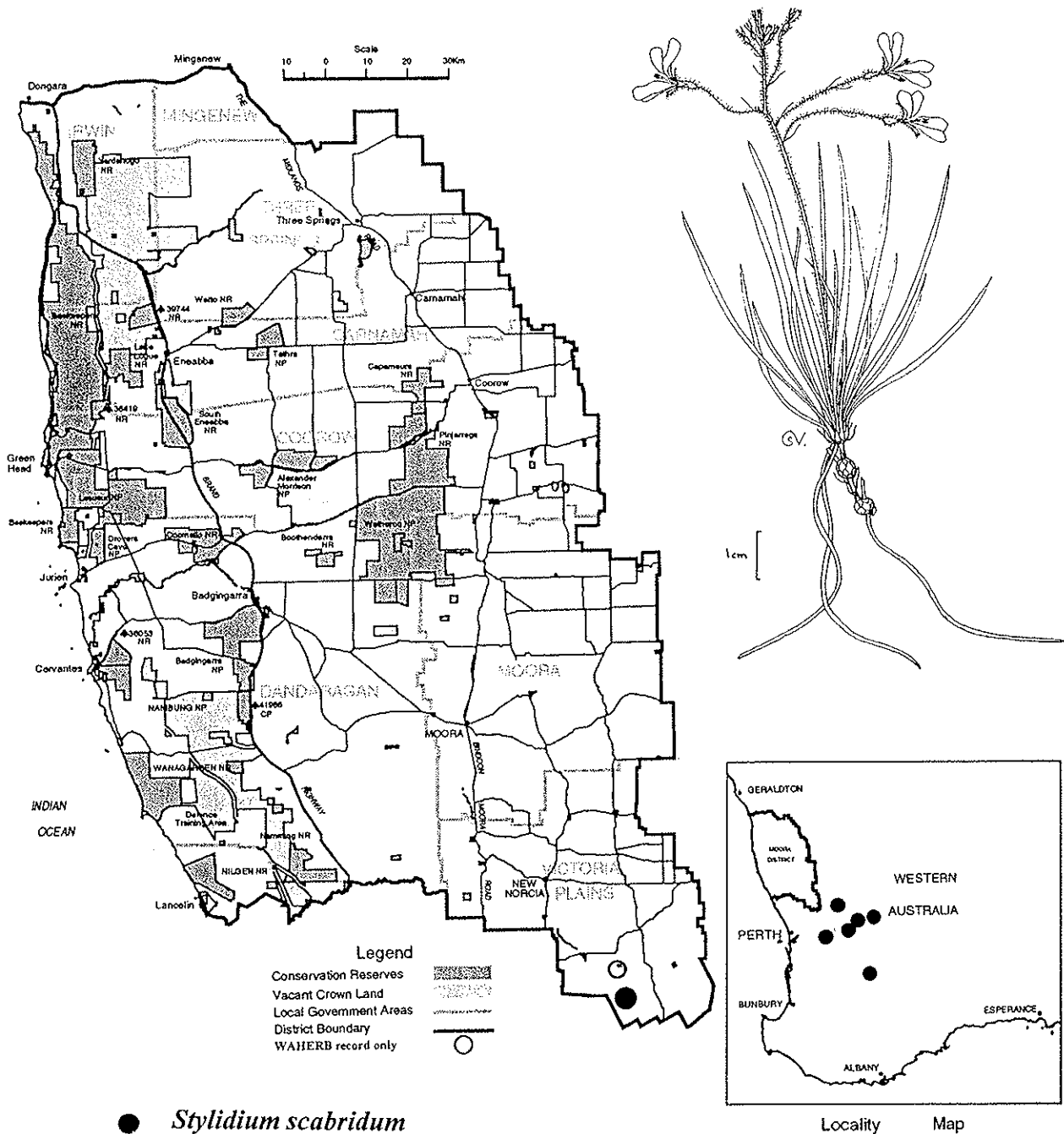
**Research Requirements**

- Opportunistic further survey in suitable habitat in the south of the District.

**References**

Erickson (1981), Grieve and Blackall (1982), Lindley (1839).

Drawing by Catherine Vasilu





## *Thelymitra stellata* Lindl.

ORCHIDACEAE

Star Sun Orchid

Named by John Lindley in 1840 from specimens collected by James Drummond in 1839, *Thelymitra stellata* was later reduced to a variety of *T. fuscolutea* but following a more recent revision, has once again been recognised as a species. It is closely-related to *T. jacksonii* ms but differs in having smaller, lighter-coloured flowers, an earlier flowering period and a more northerly range of distribution. Like other members of the genus, *Thelymitra* flowers remain closed at night or on cool, cloudy days, opening only in warm, sunny weather.

**Flowering Period:** Late September-November

### Distribution and Habitat in the Moora District

A rare but widespread species known from 23 small populations between Three Springs and Pinjarra, with a single disjunct occurrence near Dumblebung. In the Moora District it is known from areas of low heath on the lateritic tops of hills in 9 populations between Mt Lesueur and Eneabba.

### Conservation Status

Current: Declared Rare Flora

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
5. ENE of Mt Lesueur	-	Nature Reserve	1987	2	-
6. NNE of Mt Lesueur	-	National Park	11.1987	5	Good
7a. SW of Warradarge Hill	-	National Park	1988	3	Good
7b. SW of Warradarge Hill	-	Private	-	0	Population appears to have been destroyed
8. SSE of Coomaloo Hill	D	Nature Reserve	11.1992	0 (2 seen in 1989)	-
13. Robb Rd, N of Eneabba	TS	VCL	11.1991	10	Good
14. N of Eneabba	TS	VCL	11.1991	12+	Good
15.* ENE of Jurien	D	Nature Reserve	11.1991	0 (last seen in 1975)	-
20.* NE of Mt Peron	-	National Park	10.1979	0 (last seen in 1975)	-
23. Mt Lesueur	-	National Park	-	1	Good

### Response to Disturbance

Fire does not affect plant if it occurs during its dormant period (December-April). However, plants are adversely affected if burnt during their growing period (May-November). Susceptibility to weed invasion is high, weeds competing with the plants, and grazing is also detrimental.

### Susceptibility to *Phytophthora* Dieback

Unknown, but thought to be low.

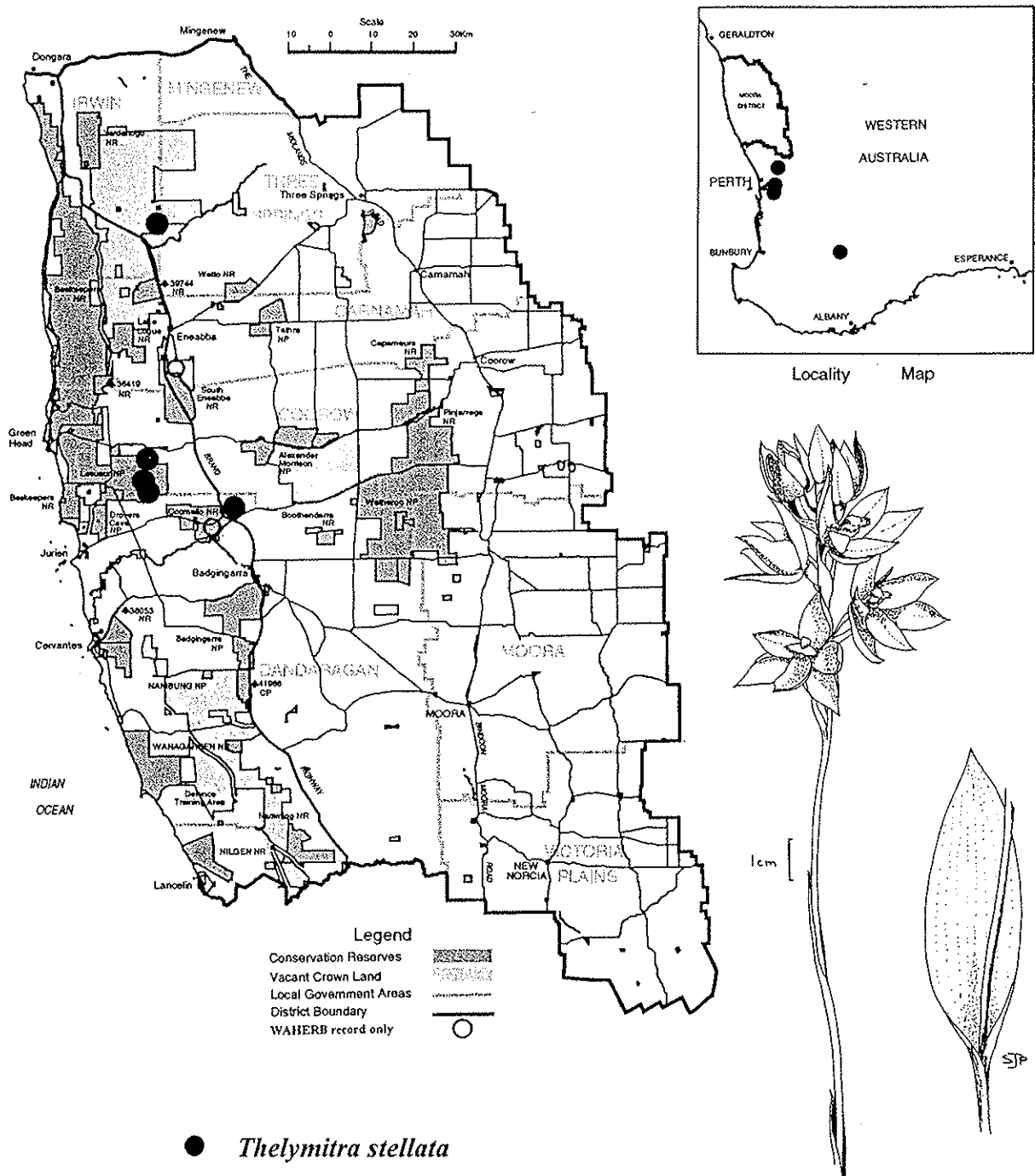
- Ensure that dieback hygiene procedures are carried out at all populations.
- Germplasm material should be collected for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

**Research Requirements**

- Further surveys should be carried out in areas of suitable habitat.

**References**

Hoffman and Brown (1992), Hopper *et al.* (1990), Lindley (1840), Patrick and Hopper (1982).



*Verticordia albida* A.S.George

MYRTACEAE

White Featherflower

This species was first collected in 1961 by F. Lullfitz and was described in 1991 by Alex George. It is a tall shrub to 2.6 m high, with leaves which are orbicular in shape and which have smooth margins. They are 2-4.5 mm wide. The flowers are in dense spikes and are white with a pink centre. The bracteoles are persistent. The sepals are 4-6 mm long with 10-13 plumose lobes, and with peltate, white, fringed basal auricles covering the hypanthium. The midrib of the sepal lobe is 0.1-0.2 mm wide. The petals are 4-5 mm long, almost orbicular in shape, with a fringe 1 mm long and with small basal auricles. The anthers are attached basally with a swollen filament apex, opening by slits. The staminodes are entire, linear-subulate, with prominent oil glands. The style is 6-6.5 mm long, curved in the upper part with a beard of sparse hairs 0.5-0.7 mm long.

This species is related to *Verticordia chrysostachys* which occurs from Northampton to the Murchison River. It differs from that species in its flower colour (yellow in *V. chrysostachys*), the shorter, broader petals, sparsely glandular stamens, style less curved and with sparse hairs surrounding the upper style. *V. albida* hybridises with *V. muelleriana*, the hybrid having flowers varying from creamish-white to pale pink or dark pink on separate plants or on the same plant.

**Flowering Period:** Late November-January

**Distribution and Habitat in the Moora District**

Known currently from three populations, less than 2 km apart, south-west of Three Springs. The species has been recorded in the past from near Eneabba and from another locality west of Coorow. It grows on white-grey to yellow sand over gravel in scrub or thicket to 3 m. Associated species include *Banksia prionotes*, *Callitris* sp., *Eucalyptus todtiana* and *Jacksonia* sp.

**Conservation Status**

Current: Declared Rare Flora

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Three Springs	TS	Shire Road Reserve, Private	10.8.1994	250	Partly cleared to improve visibility on corner, some plants regenerating three years later
2. Three Springs to Eneabba Road	TS	MRWA Road Reserve	10.8.1994	20+	Partly cleared by road works
1.* W of Coorow	Co	-	15.1.1967	-	Not refound in 1992
1. Sweetman Road	TS	Shire Road Reserve	3.1.1995	10	Undisturbed
1.* Eneabba	-	-	17.12.1962	-	-
2.* Eelya Park	Ca	-	10.12.1966	-	This area cleared

**Response to Disturbance**

Several plants regenerated at population 1 about three years after it had been partially cleared.

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

## Management Requirements

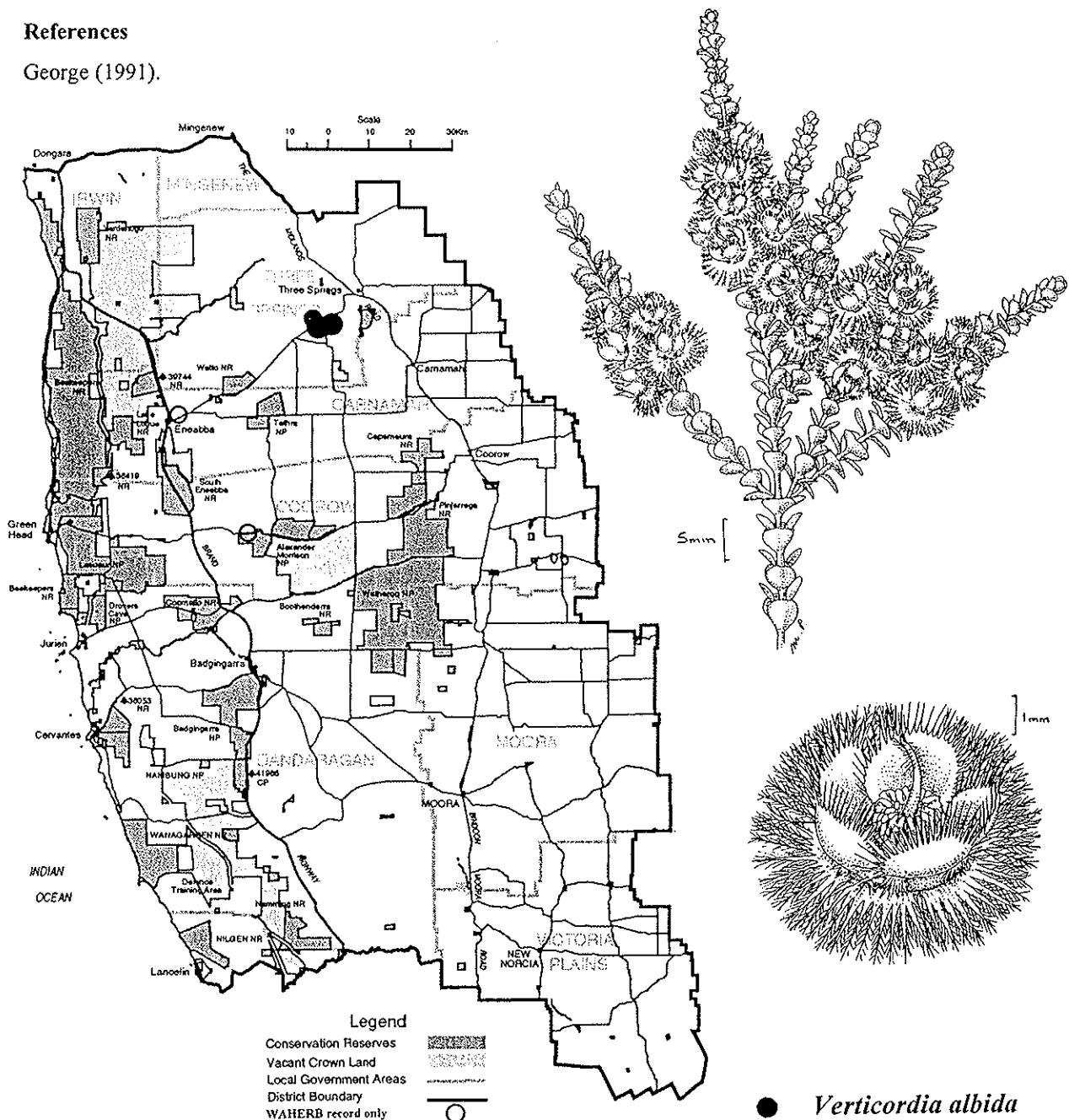
- Ensure that dieback hygiene procedures are carried out at all populations.
- The road verge populations need to be monitored, particularly for disease.
- Maintain liaison with landowner and local authority.
- Protect from frequent fire, where possible, until response is known.
- Control weeds at road verge populations.
- Investigate the possibility of land acquisition.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

## Research Requirements

- Further survey is required, particularly between Three Springs to Eneabba and Alexander Morrison National Park.
- Conduct research on the population biology and fire response of the species.
- Consider establishment of the species in a conservation reserve.

## References

George (1991).



## *Wurmbea tubulosa* Benth.

## COLCHICACEAE

### Long-flowered Nancy

This species was described in 1878 by George Bentham from material collected at Champion Bay, which is now part of the town of Geraldton.

*Wurmbea tubulosa* is a small plant 1-3 cm tall, with an ellipsoid corm to 2.5 cm long. There are three leaves, the lower two are basal and similar in length and width, without a distinct section of stem between their bases. They are very broad, 3-22 mm wide, lanceolate in shape, held flat to the ground. The upper leaf is smaller and erect, emerging from the two lower leaves or attached to the stem just above them. The flowers are either male or female, borne on separate plants. There are 1-16 flowers in the inflorescence. The male flowers are in an open inflorescence which is taller than the uppermost leaf, whereas the female flowers are in a dense inflorescence which is almost concealed between the two basal leaves at ground level. The perianth is 6-7 mm long in male flowers, 9-12 mm in female flowers, white to pale pink in colour and joined at the base into a long tubular section, for about half the perianth length. The upper section of the perianth is divided into six equal lobes, each having a single nectary, which is a narrow, curved mauve pink band, situated a third to a half the distance from the base of the lobe, and slightly raised. There are six stamens in the male flowers and a superior ovary with three styles in the female flowers. The fruit is a capsule with spherical, smooth, brown seeds.

This species differs from all other Western Australian species in that the perianth is tubular for up to half its length. *W. drummondii* is a related species but differs in that the perianth is united into a tube for up to a quarter of its length. It also differs in the smaller flowers, which are fewer in each flower head.

**Flowering Period:** June-July

### Distribution and Habitat in the Moora District

Until survey work was undertaken in the Moora District, this species was known from five populations in the Geraldton District, two from west of Mingenew (populations 3 and 4), another from east of Mingenew (population 5) and two north of Dongara (populations 1 and 2). However, in 1991 a sixth was found east of Dongara in the Moora District. More recently two populations have been found further to the south-east. One is within the Moora District to the north of Three Springs, the other at Yandanooka. The plants in both these populations appeared smaller than is typical for the species, but is thought to be a result of poor growth in a dry season. They appear to be almost intermediate with *W. drummondii*. The geographic range for the species is ca. 100 km, but the type location at Champion Bay is ca. 35 km further north. *W. tubulosa* grows in clay and sandy clay, clay loam or brown loam under shrubs on riverbanks, along drainage lines and in seasonally wet places in woodland of *Eucalyptus loxophleba* with an open shrub layer including *Acacia* and *Hakea* species beneath. This species appears to be variable in the number of plants that are seen at a particular population from one year to another, possibly depending on good rainfall.

### Conservation Status

Current: Declared Rare Flora

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
6. E of Dongara	I	MRWA Road Reserve, Railway Reserve	7.8.1992	100+	Some plants growing on well- used track, population with weed infestation
7. Yandanooka	Mi	Townsite Reserve	11.6.1991	1000+	Undisturbed
8. N of Three Springs	TS	Shire or MRWA Gravel Reserve	23.8.1993	1000 est.	Undisturbed

### Response to Disturbance

Unknown. Plants at population 6 were growing on a well-used, compacted track with little other vegetation. There were few plants in the areas adjacent to the track, which were heavily weed infested. A large population in the Geraldton District had been grazed for many years until shortly before its discovery.

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

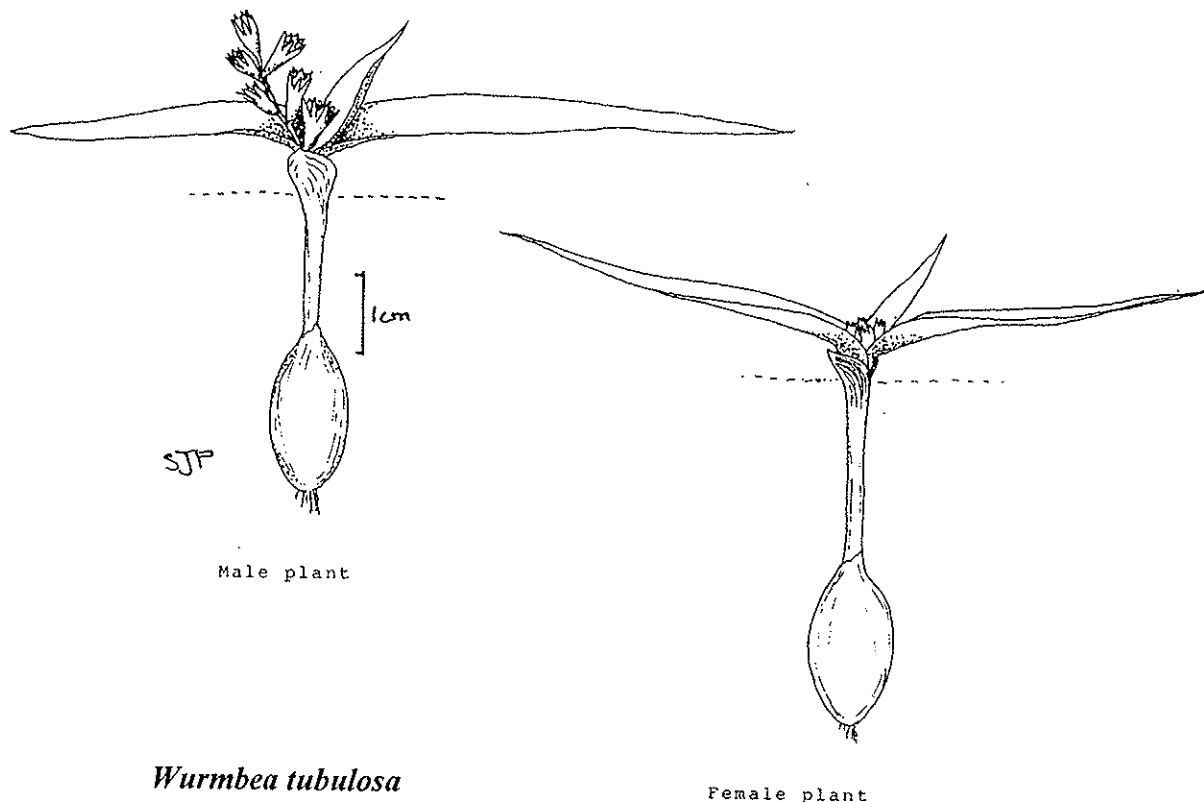
- Monitor populations regularly.
- Consider weed control at population 6.
- Maintain liaison with managers of land on which the populations occur.
- Efforts should be made to acquire the townsite reserve on which population 7 occurs as a conservation reserve.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

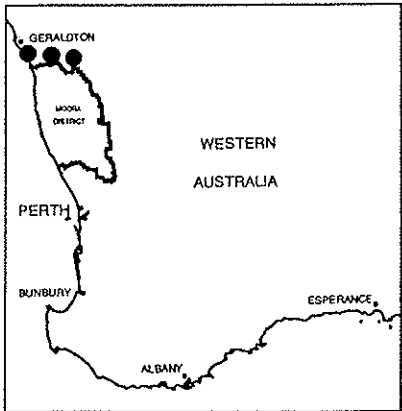
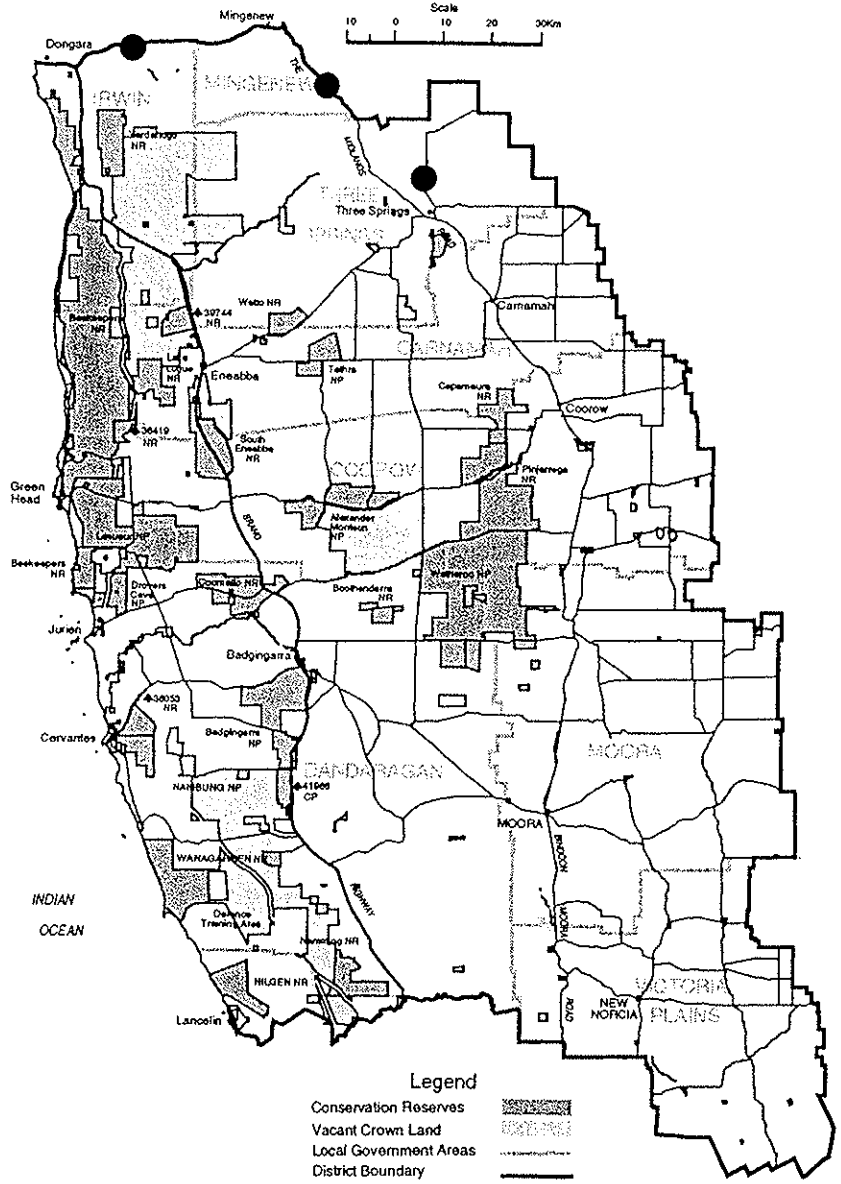
### Research Requirements

- Further survey is required for this small and inconspicuous species, particularly in suitable habitat in the Geraldton District.
- Reassess the conservation status of the species after fieldwork has been completed for the Rare Flora Management Program for the Geraldton District.

### References

Bentham (1878), Macfarlane (1980, 1987), Patrick and Hopper (1982).





Locality Map

● *Wurmbea tubulosa*

## B. Presumed Extinct Taxa

### *Calothamnus accedens* Hawkeswood

MYRTACEAE

*Calothamnus accedens* was described in 1984, when it was known from one population of 14 plants found in 1980 on a narrow road verge near Piawaning on the western side of the Merredin District.

*C. accedens* is a slender, erect and much-branched shrub to 1.8 m tall. The leaves are densely crowded at the ends of the branches, which have prominent leaf and bud scars lower down. The leaves are sessile, stiff and linear, 10-15 mm long, 0.8-1 mm wide, with long, spreading, whitish hairs which are shed on the older leaves. The flowers are grouped 4-10 in short clusters, usually on one side of the stem but sometimes almost encircling it, on the lower parts of the stem from which the leaves have fallen. The calyx tube is bell-shaped, densely hairy at the base, the hairs shorter and less dense higher up. There are five narrow petals to 7 mm long, orange-brown in colour, and five equal staminal claws, 20-25 mm long, pinkish-red to dark crimson in colour. They have 15-19 filaments on each claw, the anthers are 1-1.5 mm long. The fruit are depressed globular to cylindrical, with five short lobes which wear away with age. They are 5-6 mm long, 6.2-8 mm wide, densely hairy at first. The seeds are 1.5-2 mm long, dark or chocolate brown in colour.

This species is closely related to *C. brevifolius*, which differs in its shorter height, to 0.5 m tall, with slightly narrower, less hairy leaves and flower clusters on leafy parts of the stems, and with 1-5 smaller flowers with shorter anthers in each flower cluster. *C. brevifolius* has hairs on the calyx tube which are thicker, less spreading and less than 1 mm long, and its fruits are smaller, with smaller, brown seeds. *Calothamnus accedens* also has close affinities to *C. hirsutus*, which is a shorter shrub to 1 m tall and which has longer leaves 20-25 mm long, flower clusters on leafy stems with 4-8 flowers in each cluster, 20-25 stamen filaments on each staminal claw, shorter anthers, narrower fruits, 5-6 mm wide and smaller seeds, 0.7-1 mm long, dark grey in colour.

The three species are thought to be closely related and there is some overlap in several of these characters.

**Flowering Period:** February

#### **Distribution and Habitat in the Moora District**

The population from which the species was described, occurred just east of the Moora District to the east of Piawaning, in the Merredin District, but has since been destroyed by roadworks. Specimens from Watheroo, Three Springs and the Lesueur area closely approach *C. accedens* and *C. hirsutus* but cannot be assigned to either species with certainty. These have been given the phrase name *Calothamnus* sp. Lesueur (E.A.Griffin 2490) [aff. *hirsutus*]. Further collections are needed, with study in the field and further taxonomic work to clarify the status of these populations. At the original population, *C. accedens* grew in sandy soil over laterite, on a road verge with remnant heathland vegetation including *Melaleuca scabra* and *Acacia* sp.

#### **Conservation Status**

Current: Declared Rare Flora, Presumed Extinct

#### **Response to Disturbance**

The population when last seen was surviving on a road verge infested with "grassy weeds".

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

Presumed susceptible

#### **Management Requirements**

- Populations of *C. sp.* Lesueur (E.A.Griffin 2490) [aff. *hirsutus*] need to be protected from disturbance or possible loss, at least until the status of this taxon has been clarified.

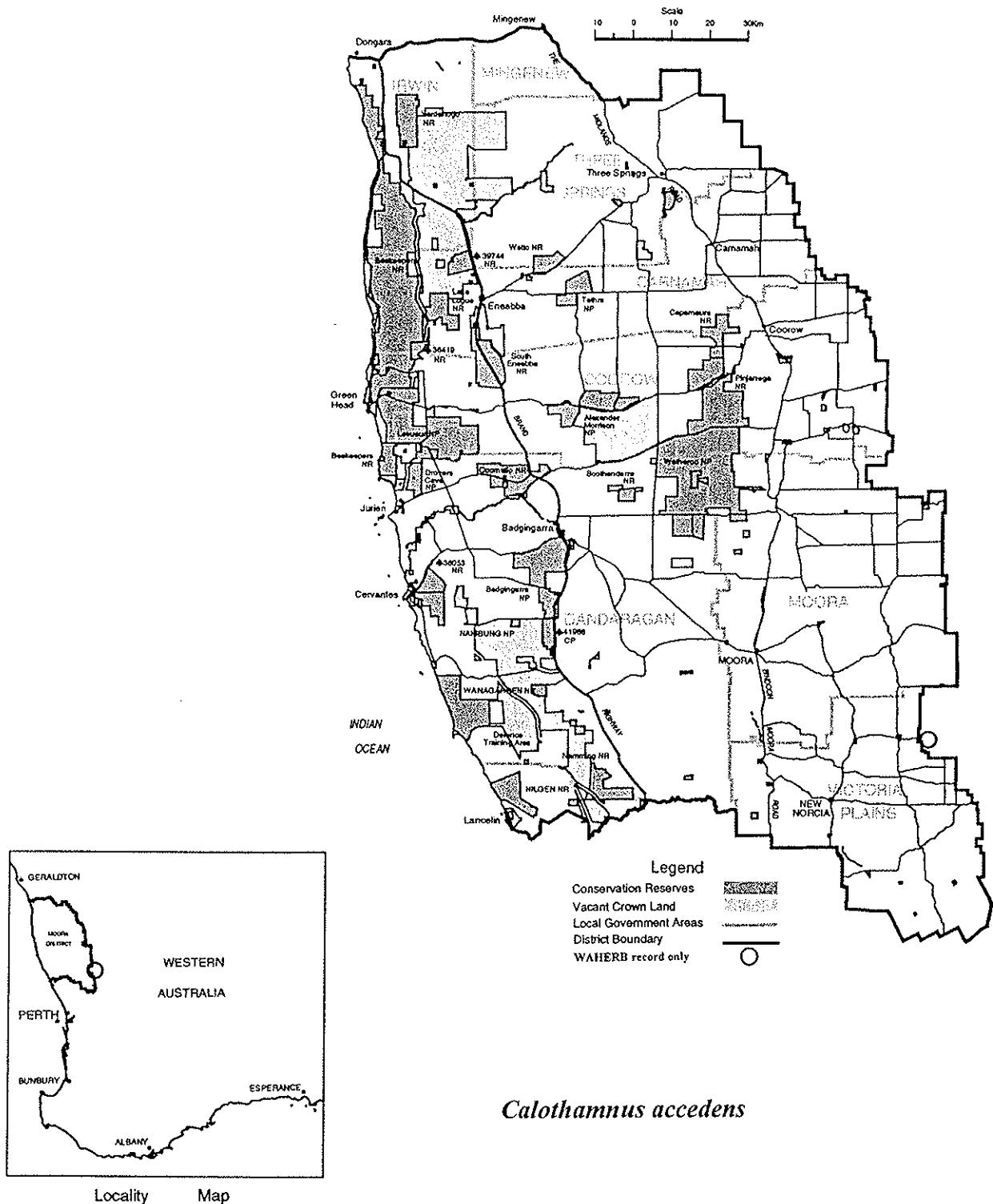


## Research Requirements

- Further collections should be made, with further study in the field and taxonomic work to clarify the status of *C. sp. Lesueur* (E.A.Griffin 2490) [aff. *hirsutus*] and its relationship to *C. accedens*.

## References

E. Griffin (personal communication), Hawkeswood (1984a, 1984b).



This species is known only from the type collections made in 1947 by C.A. Gardner and from collections made by Drummond last century. It was described in 1974, the specific name referring to the rounded leaves.

*Lasiopetalum rotundifolium* is an erect shrub to at least 40 cm tall, with branchlets with stellate and simple hairs. The leaves are alternate, on stalks 10-20 mm long, the blade 7-35 mm long and 9-30 mm wide. They are deeply wrinkled and almost circular in shape, with lobes above the point of attachment of the stalk, giving a deep heart shape. They have a close covering of grey, stellate hairs on the lower surface, and are hairless on the upper surface. The inflorescence is compact, with a straight main axis, 20-40 mm long with ca. 8 flowers. There is one ovate bracteole below each flower, distant from the calyx, which is pink, 6 mm long, tomentose on the outside and divided nearly to the base into 5 ovate lanceolate lobes. The petals are absent. There are five maroon anthers and the style has large, white, reflexed, stellate hairs. *L. rotundifolium* is closely related to *L. molle*, which occurs between Perenjori and Newdegate and has ovate, less cordate leaves.

**Flowering Period:** September-October

#### **Distribution and Habitat in the Moora District**

The specimens collected by James Drummond are without precise locality information. The locality south of New Norcia has been searched without success, during this survey and in 1982 (Millar 1982). There are no habitat details recorded for the species but the locality south of New Norcia has been partially cleared. Much of the area was originally wandoo woodland.

#### **Conservation Status**

Current: Declared Rare Flora, Presumed Extinct<sup>#</sup>

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
I.* S of New Norcia	VP	-	1.10.1947	-	-

#### **Response to Disturbance**

Unknown, but thought to be high.

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

Unknown

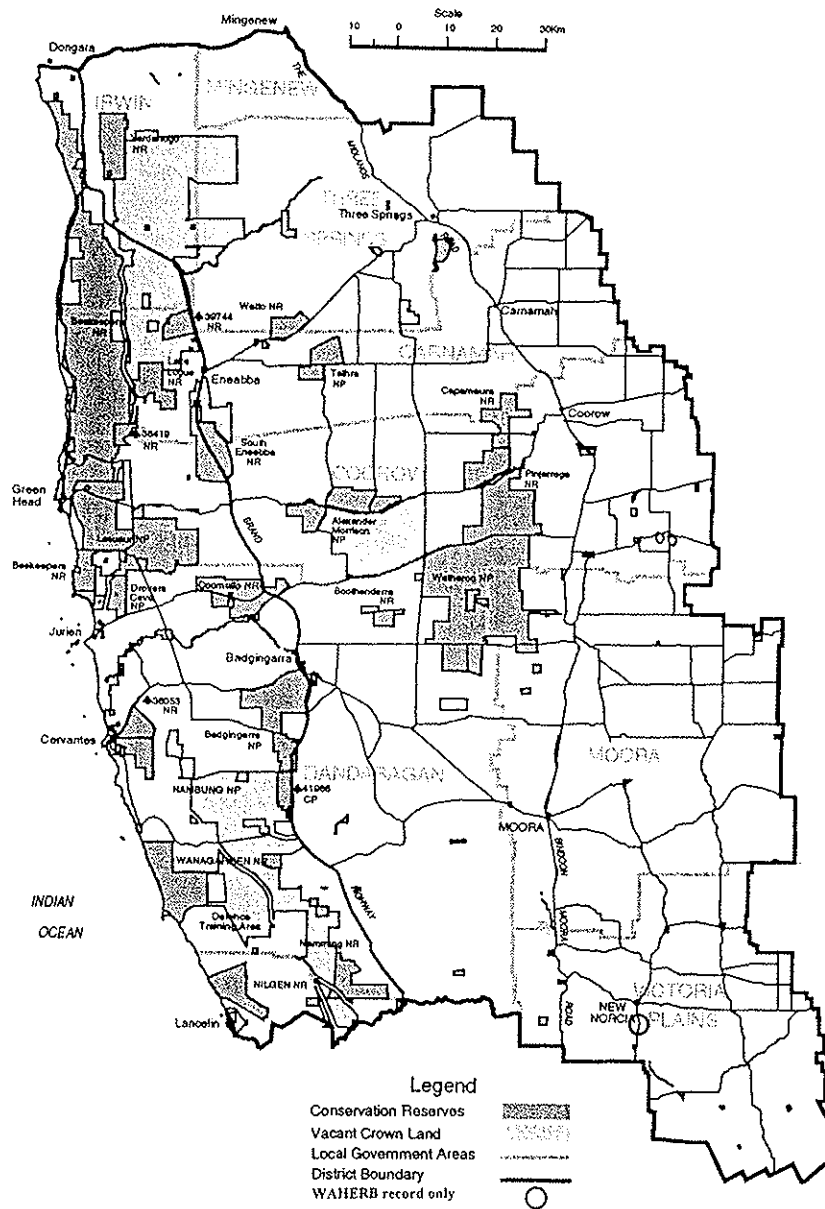
#### **Research Requirements**

- Further survey should be conducted for the species particularly in conservation areas south of New Norcia in conjunction with survey for the two undescribed species of *Thomasia* ("New Norcia" and "Green Hill") which are poorly known, listed as Priority 1 and have been recorded from the same area.

#### **References**

Leigh *et al.* (1984), Millar (1982) Paust (ca. 1973, 1974).

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



*Lasiopetalum rotundifolium*

*Leucopogon marginatus* was originally collected from sandplains, at Arrino in September 1903 by W.V. Fitzgerald. It is an erect shrub 45-60 cm tall, with alternate leaves which are erect, the margins often curled round the stem, ovate to ovate lanceolate in shape, with crisped, membranous margins and with a pungent point. The leaves are concave and striate in the lower half, 4-6 mm long and almost sessile, with a very short stalk. The flowers are in groups of one to three in the axils of the upper leaves. Each flower has bracteoles at the base as third as long as the sepals, rounded with membranous margins. The five sepals are broadly lanceolate. The flower is white, joined at the base to form a tube just longer than the calyx. The five free lobes are bearded on the inside, but with acute, hairless tips. The anthers are oblong, attached near the top of the tube, and are without sterile tips. The style is barely longer than the petal tube.

Allied to *L. obtectus* and *L. crassiflorus*, differing from the former in the foliage, which does not have a mucronate tip and from the latter in the inflorescence, in which the peduncles are 1-2 flowered. It is also similar to *L. amplexans*, which has sterile tips to the anthers.

**Flowering Period:** July-September

#### **Distribution and Habitat in the Moora District**

The species has not been re-found in the Moora District since the type collection was made at Arrino in 1903, in the north-east of the District. It was recorded as growing on sandplain. However, six populations of a *Leucopogon* species were found on road verges in the Merredin District and one other in the Esperance District in 1990 by F. Mollemans who identified them as *L. marginatus* but was not able to confirm his identification with J.M. Powell, who is working on a revision of the genus *Leucopogon* (Mollemans *et al.* 1993). These specimens have recently been confirmed as this species.

#### **Conservation Status**

Current: Declared Rare Flora, Presumed Extinct<sup>#</sup>

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
I.* Near Arrino	?TS	-	9.1903	-	-

#### **Response to Disturbance**

Unknown

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

Presumed susceptible

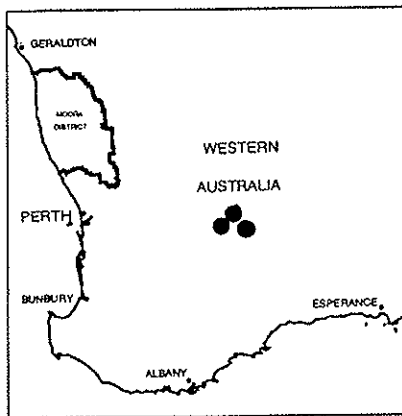
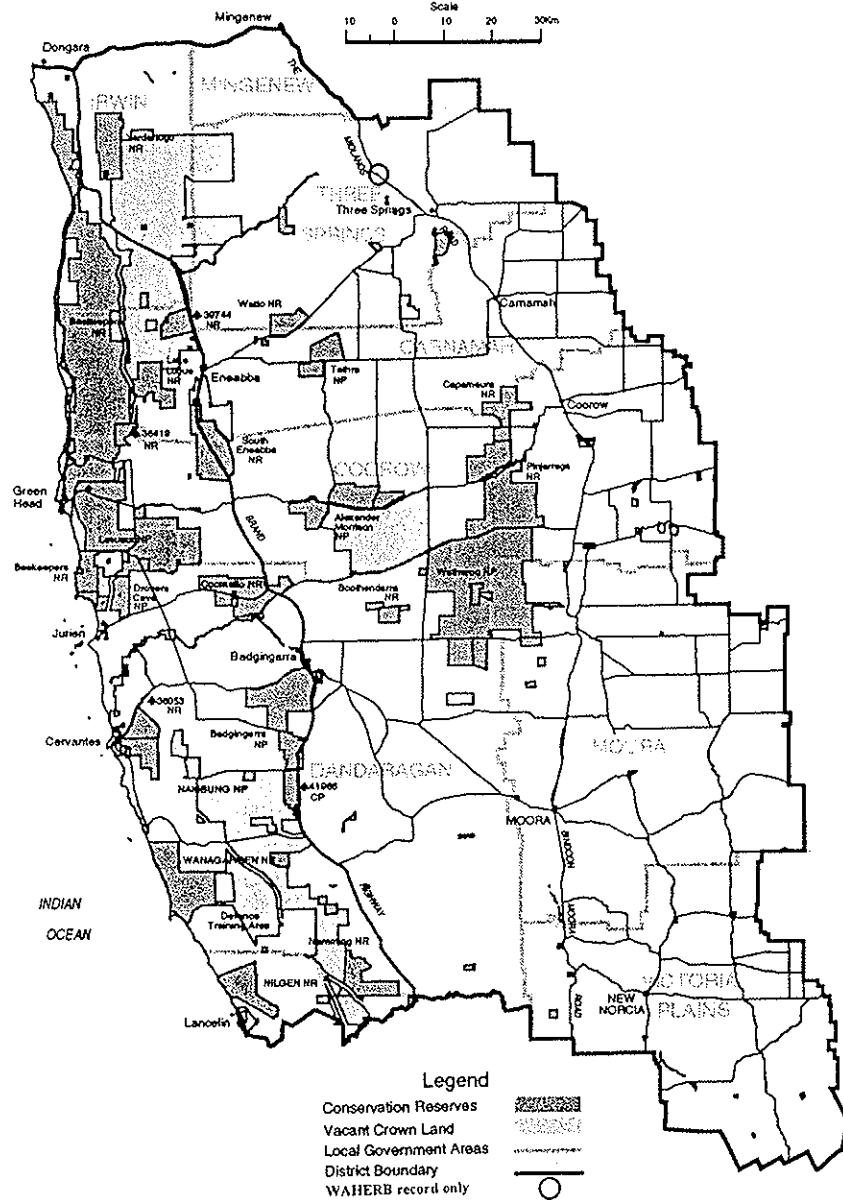
#### **Research Requirements**

– Further survey is required, particularly in the Arrino area.

#### **References**

Blackall and Grieve (1991), Fitzgerald (1904), Mollemans *et al.* (1993).

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



Locality Map

● *Leucopogon marginatus*

*Menkea draboides* (Hook.f.) Hook.f. ex Benth.

BRASSICAEAE

This species was collected by James Drummond in 1843 and since then has been collected only three times. It was originally described and illustrated by Hooker as *Stenopetalum draboides*.

*Menkea draboides* is a prostrate, spreading herb, with hairless stems to 60 cm long. The basal leaves are obovate, entire or with a few lobes or teeth. They are ca. 3 cm long and ca. 10 mm wide, the blade narrowing to a slender stalk almost as long as the blade. The stem leaves become smaller, higher up the stems. The flowers are white, borne in dense, few-flowered inflorescences. There are four sepals and petals. The latter are ca. 3 mm long, with a broad blade narrowing to a linear claw. There are six stamens, a papillose ovary and short style. The seed pod is flattened and dry, splitting down two sides, leaving a central partition. It is often twisted and the valves are papillose. The seeds are dark red-brown in colour.

Differs from other species of *Menkea* in the twisted, papillose seed pod.

**Flowering Period:** August-September

**Distribution and Habitat in the Moora District**

Apart from two collections made in the Moora District, the species has also been found in 1889 at Yilgarn near Southern Cross in the Merredin District. The collection made by Drummond is without location information. Of the collections made in the Moora District, there is some doubt as to whether the collection from the rabbit proof fence (ca. 50 km east of Watheroo) was made from that area, which is on the border with the Merredin District or from Wooroloo, which is north-east of Perth in the Swan Region.

Recent taxonomic study has brought to light five collections of this species, from north of Meekatharra in 1986, and in 1980 from north of Paynes Find, Woodline and north-east of Norseman.

It grows in clay or red loam over granite, or in granitic loamy sand, in wet places including drainage lines and at Woodline with samphire on the margin of a salt lake (B. Lepschi, personal communication).

**Conservation Status**

Current: Declared Rare Flora, Presumed Extinct<sup>#</sup>

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* Watheroo	Mo	-	9.1905	-	-
2.* Watheroo, Rabbit Proof Fence	Mo	-	8.1905	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

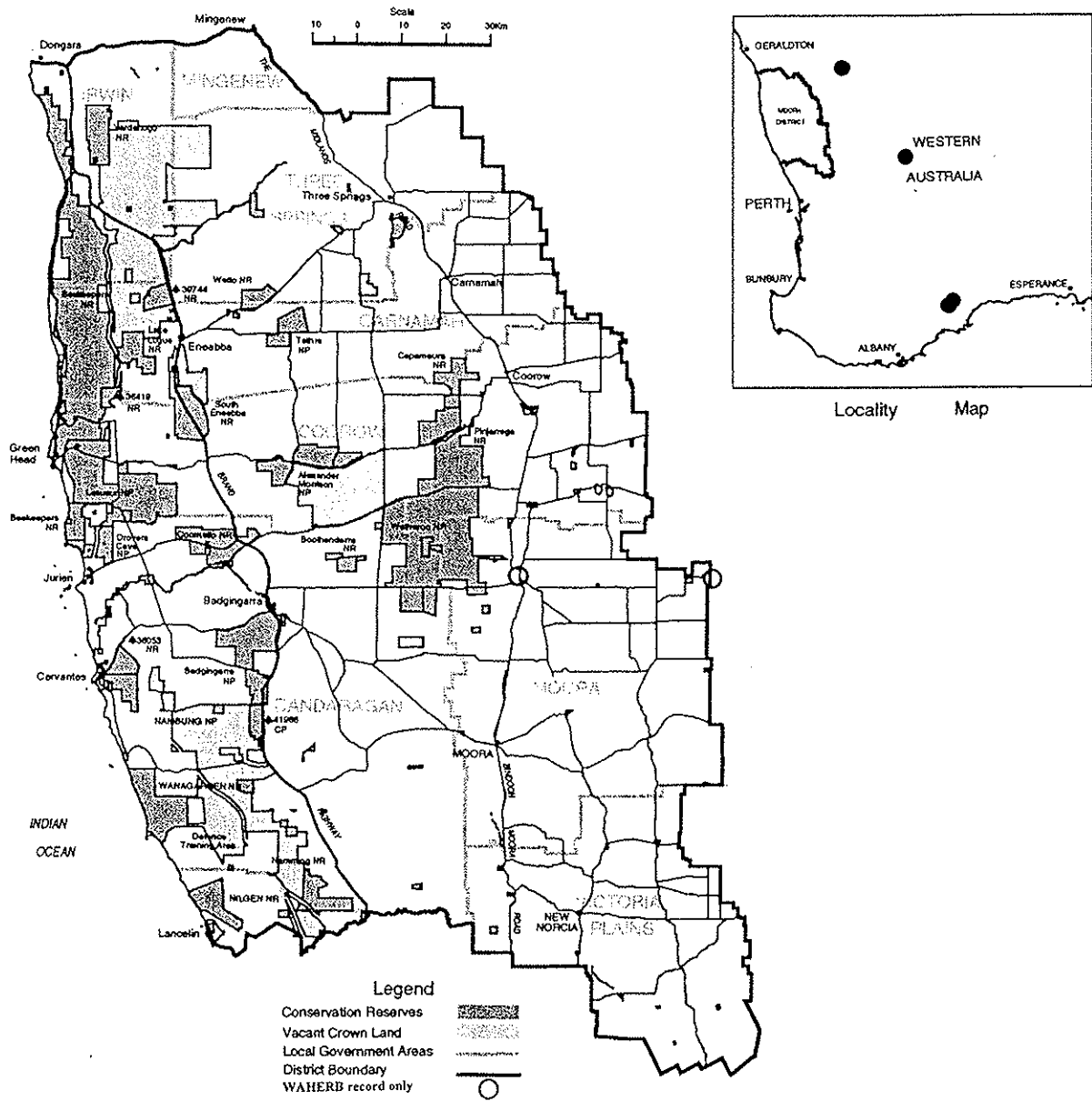
**Research Requirements**

– Further survey for the species is required, particularly to refind and survey areas where recent collections have been made.

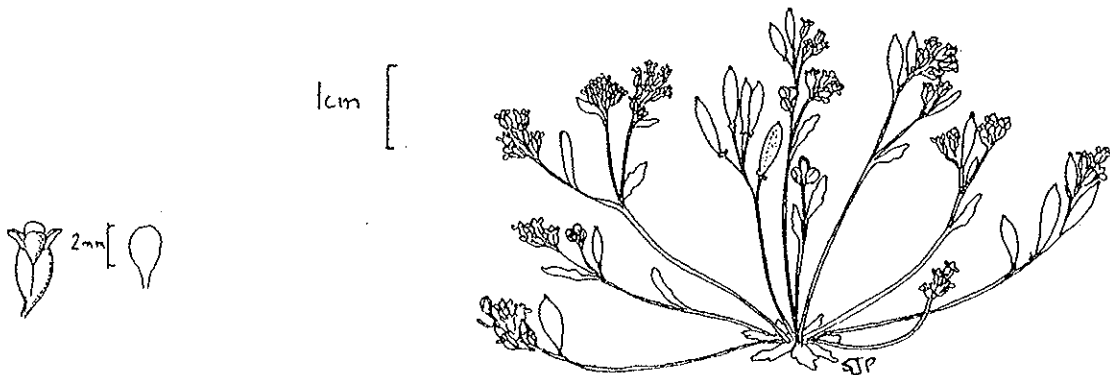
**References**

Bentham (1863), Hewson (1982), Hooker (1844), Leigh *et al.* (1984), Mueller (1861), Shaw (1970).

<sup>#</sup> now extant listed Priority 3 (updated at December 1999)



● *Menkea draboides*



Dissected Platysace

This species is known from one collection made by James Drummond, between the Moore and Murchison Rivers last century. It was described by Benham in 1866 as *Sieberta disssecta*, and the new combination was made by Norman in 1939.

*Platysace disssecta* is an upright plant to 0.3 m tall with leafy stems and sturdy, widely spreading branches. The leaves are divided two or three times into narrow, tapering lobes. The flowers are arranged in compact umbels on stout stalks, with many flowers in each umbel. The fruit are as long as broad, smooth, slightly swollen in the centre of the carpels, flat on the dorsal edge, with fine intermediate ribs. It is thought that *F. disssecta* is a leafy variant of *F. juncea* (B. Rye, personal communication).

Flowering Period: Unknown

**Distribution and Habitat in the Moora District**

The species has been recorded from between the Moore and Murchison Rivers and could therefore occur in the Moora and/or Geraldton Districts. There are no recorded details of habitat.

**Conservation Status**

Current: Declared Rare Flora, Presumed Extinct"

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1 * Between Moore and Murchison Rivers	?	-	Pre 1866	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora Dieback***

Unknown

**Research Requirements**

- The type collection needs to be examined, particularly the fruits, to clarify the relationship of the taxon with *F. juncea*.

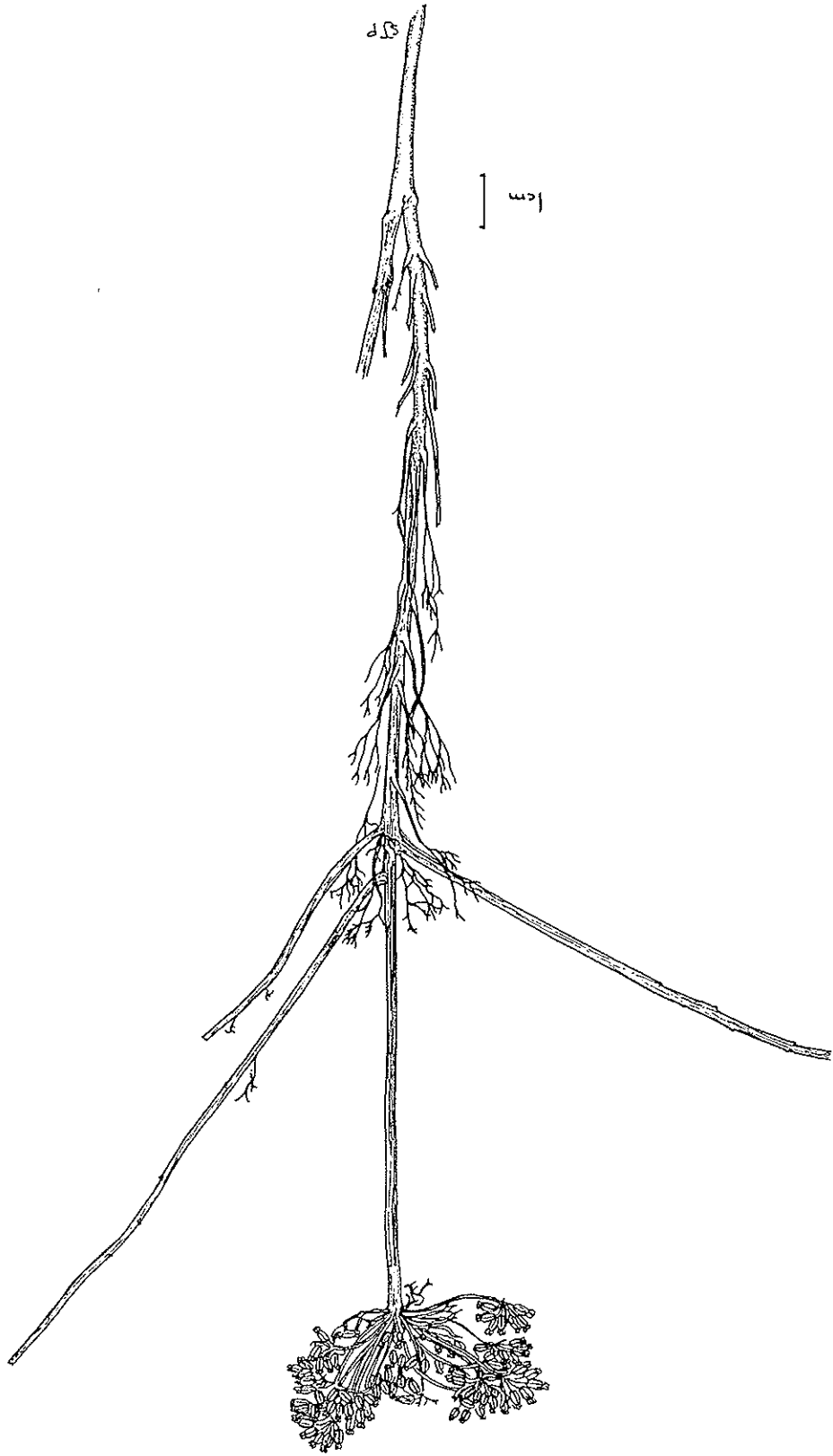
**References**

Benham (1866), Blackall and Grievé (1980), Norman (1939).

# now synonymised with *F. juncea*



*Platysace dissecta*



### PART THREE: PRIORITY FLORA IN THE MOORA DISTRICT

The taxa treated in this section are those listed on CALM's Priority Flora List (February 1994) for the Moora District. The priority categories are outlined in Part 1.4. The treatments follow the format in Part 2 but do not include detailed recommendations for management and research actions.

Priority One, Two and Three taxa require further survey to determine their conservation status as they do not meet the requirements for gazettal as Rare Flora. They may be added to the Declared Rare Flora Schedule if they prove to be truly rare, endangered or in need of special protection. Populations of these taxa, particularly those listed as Priority One and Two, should be protected from damage or destruction.

Surveys for Priority taxa were conducted mainly during the 1991-1993 period, with survey priority given to those in the Priority One and Two categories. As at February 1994, there are 85 Priority One, 70 Priority Two and 74 Priority Three taxa which have been found to occur in the District. New populations were recorded for 111 taxa and many were found to be more abundant than was previously thought. Some taxa have been given lower status already as a result of survey work (see Table 4), and several further taxa can be deleted from the list on the basis of these surveys. Table 3 lists the current and recommended status for all Priority taxa in the Moora District.

A. Priority One Taxa

*Acacia carens* Maslin

MIMOSACEAE

First collected in 1973 by Charles Chapman, *Acacia carens* is an open broom-like shrub up to 0.6 m tall. The terete green branches have yellow ribs. The phyllodes are continuous with the branches and are reduced to rudimentary stipule-like appendages 0.5 mm long, or to minute phyllodes 1-2 mm long. The peduncles are densely hairy, 2-5 mm long. The flower heads are globose, 8 mm in diameter. The legumes are linear and curved, to 10 cm long, ca. 4 mm wide.

This species, when originally collected, was identified as *A. volubilis* which has tortuous stems and which also differs in phyllode and calyx characters. It has also been confused with *A. cumminghamia* which differs in its longer peduncles and in other characters of the flowers and legumes. The reduced phyllodes of this species are alluded to in the specific name, which is derived from the Latin *carens*, meaning lacking.

Flowering Period: April-May

Distribution and Habitat in the Moora District

*A. carens* is endemic to the Moora District and has been collected in the past over a geographic range of about 15 km in the Gairdner Range, but is known at present from three populations with a range of less than 10 km. Two of these populations are on road verges, the other population of only four plants, is located within a national park. It has been reported from over 30 locations in the Lesueur National Park (E. Griffin, personal communication).

This species grows on uplands of lateritic gravel or sandy gravel in low heath, or in open low woodland and low scrub. Associated species include *Eucalyptus drummondii*, *E. calophylla* and *Daviesia* species.

Conservation Status

Current Priority I

Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1a. E of Greenhead	Co	Shire Road Reserve	1.5.1991	30	Partly disturbed
1b. E of Greenhead	Co	Shire Road Reserve	1.5.1991	9	Disturbed
2. Pen Road	Co	Shire Road Reserve	1.5.1991	147	Disturbed
3.* ENE of Mt Peron	Co	National Park	24.10.1979	-	-
4.* NW of Mt Peron	?Co	?National Park	28.9.1990	4	-
5.* Cockleshell Gully	D	National Park	28.5.1973	Locally common-WH	-

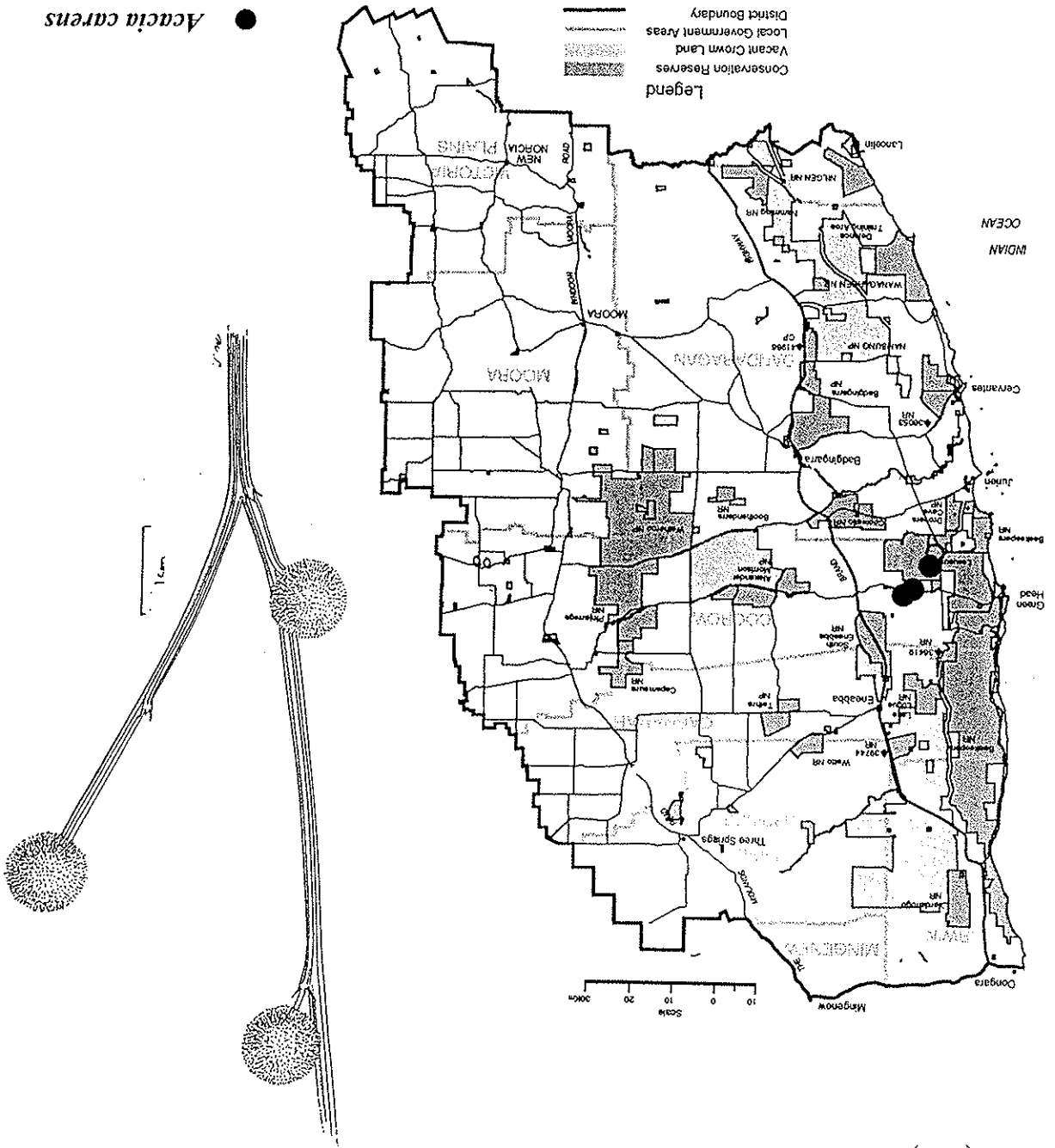
Response to Disturbance

Unknown

Susceptibility to *Phytophthora Dieback*

Unknown

*Acacia carens* ●



Mashin (1995).

**References**

- Further survey is required, particularly in the Lesueur National Park, to resurvey populations 2-4, and confirm further populations.

**Research Requirements**

- Survey required.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

**Management Requirements**

This taxon has been collected only four times, originally in 1971, by S. Paust. It is a low dense shrub to 50 cm tall. The phyllodes are terete, pungent and 8-nerved, 2-3 mm or to 5 mm long, ascending and gently recurved. The peduncles are 12-19 mm long, and the yellow, globular flower heads are 24-27 flowered and are 5 mm in diameter. The legumes and seeds are not known.

**Flowering Period:** August-September

**Distribution and Habitat in the Moora District**

Occurs in the Bolgart area. A recently surveyed population of 400 plants occurs on a nature reserve just outside the southern boundary of the Moora District, but the taxon was recorded in 1971 and 1972 from between Bolgart and Calingiri and from north of Wyening in the south-eastern corner of the District. The geographic range is ca. 17 km. Grows in sand, sandy gravel or sandy clay with laterite in open low woodland over low heath, sometimes in winter wet areas.

**Conservation Status**  
Current: Priority 1

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. * N of Wyening	VP	-	15.9.1972	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at population.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

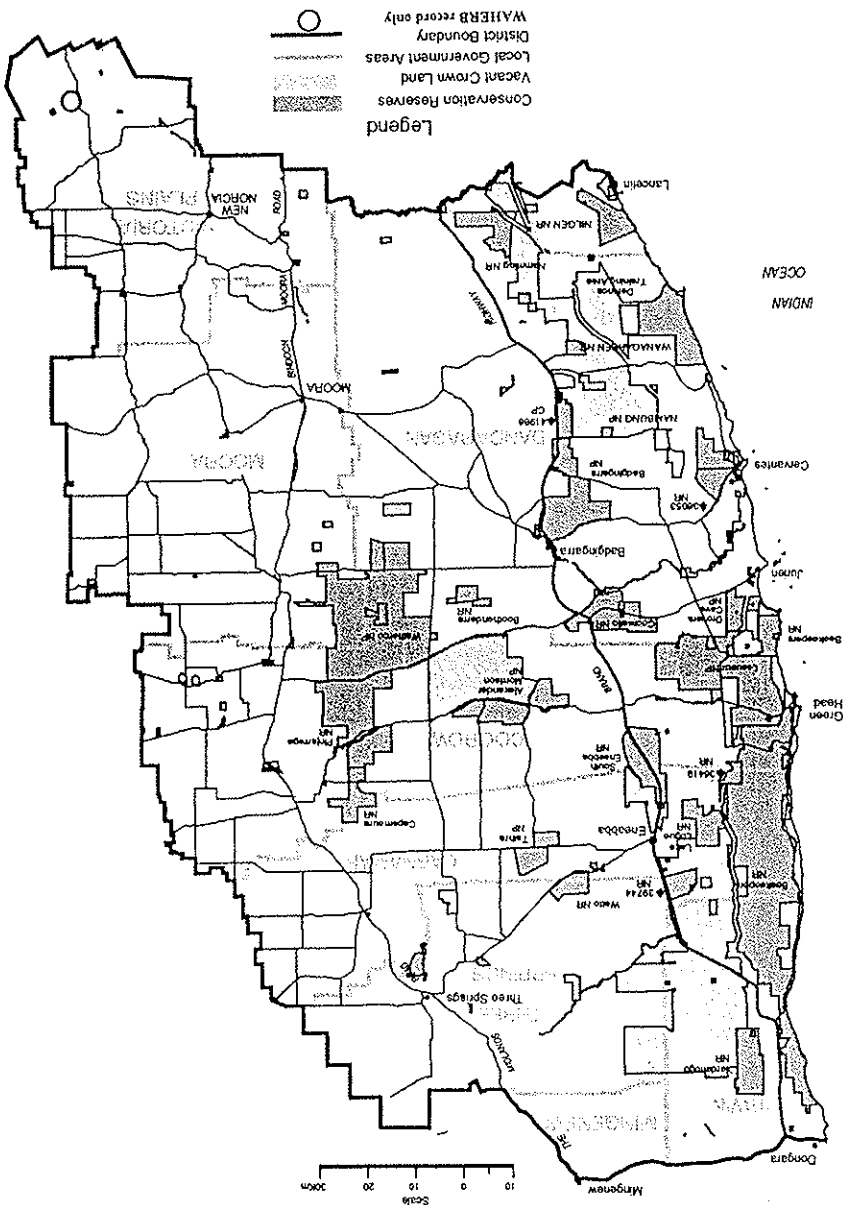
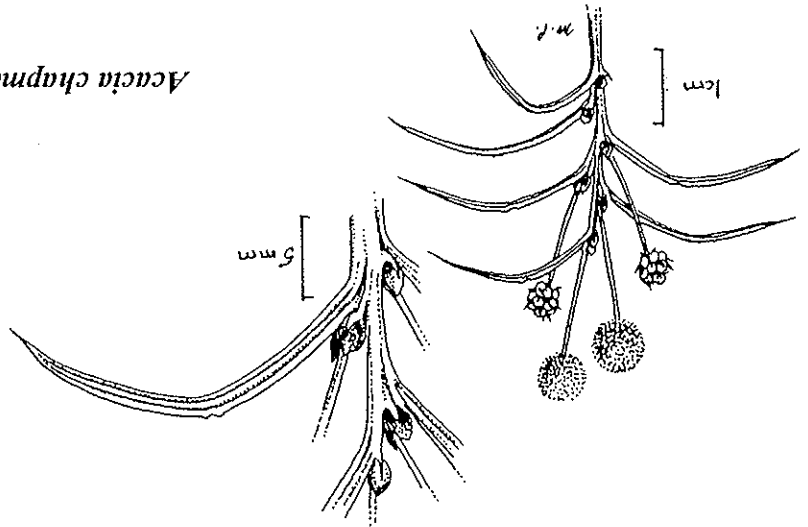
**Research Requirements**

- Further survey is required.

**References**

B. Maslin (personal communication).

*Acacia chapmani* subsp. *australis* ms



# now Declared Rare Flora (updated at December 1999)

Response to Disturbance		Susceptibility to <i>Phytophthora Dieback</i>		Unknown	
1. N of Watheroo	Mo	Private	17.10.1991	38	In cleared weed infested
2. N of Watheroo	Mo	MRWA Road	17.10.1991	13	padlock Disturbed and weed infested
1 * W of Moora	-	-	12.6.1901	-	-
2 * S of Marchagee	Co	-	15.6.1974	-	-
3 * N of Watheroo	-	-	18.7.1962	-	-

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Watheroo	Mo	Private	17.10.1991	38	In cleared weed infested
2. N of Watheroo	Mo	MRWA Road	17.10.1991	13	padlock Disturbed and weed infested
1 * W of Moora	-	-	12.6.1901	-	-
2 * S of Marchagee	Co	-	15.6.1974	-	-
3 * N of Watheroo	-	-	18.7.1962	-	-

## Populations Known in the Moora District

Conservation Status  
Current: Priority 1#

Grows mainly in disturbed roadside situations on sand, or clayey sand with laterite in open shrubland. Associated species include *Allocasuarina campestris*.

Has been recorded in the past over a range of ca. 20 km north of Watheroo but most of these roadside populations appear to have been lost. Only two populations have been surveyed recently in this area and these grow within a kilometre of each other. The population known from an early collection made from west of Moora has not been re-found. This is some 45 km south of the main range of the species.

## Distribution and Habitat in the Moora District

Flowering Period: June-July

This taxon is similar to *A. alocophylla*, which has 8-nerved phyllodes, and to *A. tetraeneura* which has 4-nerved phyllodes and bracteoles exserted on the buds. *A. cochlocarpa* subsp. *velutinosus* occurs near Mannamanning and differs in its shorter phyllodes, velutinous branchlets, phyllodes and legumes, and in its smaller, oblongoid flower heads.

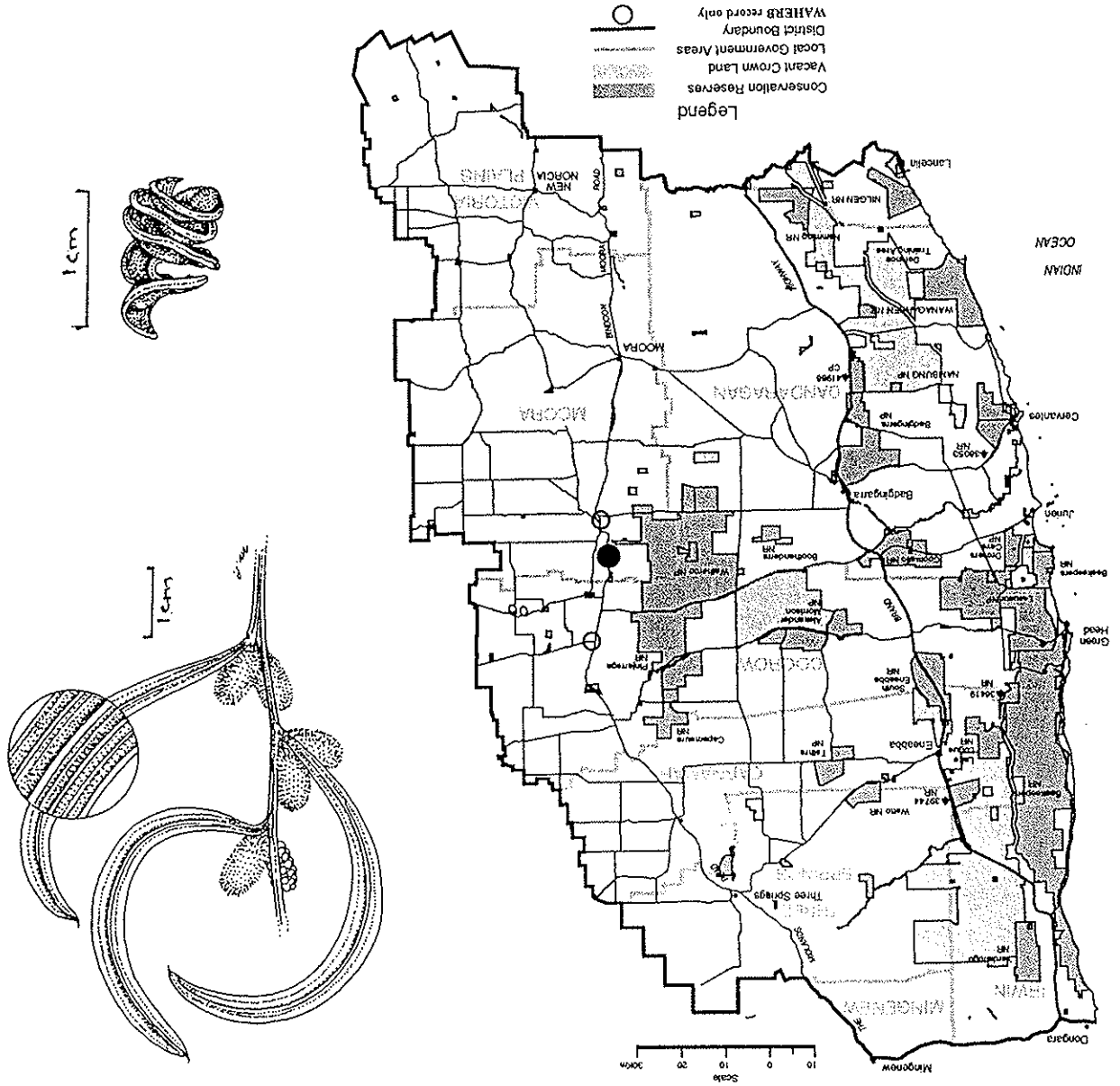
*Acacia cochlocarpa* subsp. *cochlocarpa* is a sprawling, glabrous shrub to 0.7 m tall with slightly flexuose branchlets. The phyllodes are linear to narrowly elliptic, 3-7.5 cm long, 3-6 mm wide, incurved and erect, with 7 nerves per face. The flower heads are golden, sessile and cylindrical, 7-10 mm long. The legumes are tightly coiled, 3-4 mm wide.

This subspecies is restricted to the Watheroo area and there is also an early collection from near Moora. It was first collected by James Drummond from "Swan River" and "between Moore and Murchison Rivers" and was described by Meissner in 1855. Diels made a collection in 1901 "westward from Moora" and subsequent collections have been made from the Watheroo area.

*Acacia cochlocarpa* Meisn. subsp. *cochlocarpa* ms

MIMOSACEAE

*Acacia cochlocarpa* subsp. *cochlocarpa* ms



B. Mashin (personal communication), Meisner (1855).

References

— Further survey is required.

Research Requirements

- Further survey.
- Ensure that road verge population is marked.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

Management Requirements



- Management Requirements
- Ensure that dieback hygiene procedures are carried out at all populations.
  - Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. S of Arrino	TS	MRWA Road Reserve	10.7.1991	5 est.	Good
2. S of Arrino	TS	MRWA Road Reserve	10.7.1991	2+	Disturbed
3. S of Arrino	TS	MRWA Road Reserve	10.7.1991	4	Disturbed and weedy,
4. * Yandanooka	MI	-	19.9.1904	-	all plants partly dead

Response to Disturbance  
Unknown

Susceptibility to *Phytophthora* Dieback  
Unknown

#### Populations Known in the Moora District

Conservation Status  
Current: Priority 1

Distribution and Habitat in the Moora District

Flowering Period: August-September

Has been collected in the past from Yandanooka, which is just north of the boundary of the Moora District to near Three Springs, a geographic range of ca. 25 km. It is at present known from three road verge populations south of Arrino with a range of 2.3 km.

Grows on lateritic gravel and brown loam in open scrub beneath open low woodland communities. Associated species include *Eucalyptus wandoo* and *A. flabellifolia*.

This taxon was originally described in 1904 by W.V. Fitzgerald as *Acacia cliffontiana* but is now included by B. Maslin (personal communication) as a subspecies of *A. congesta*. It was first collected in 1903 by Fitzgerald from Arrino.

*A. congesta* subsp. *cliffontiana* ms is a low shrub 0.5-1 m tall, with hirsute branchlets and phyllodes. The phyllodes are 5-10 mm long, 1.2-2.5 mm wide. The flower heads are globose to shortly obovate, 30-40 flowered. The legumes are constricted between the seeds and are 4-5 mm wide. This subspecies is somewhat similar to *A. idiomorpha* which has more undulate phyllodes, with a convex abaxial margin, and there are differences in the calyx, petals and legumes. It is also similar to *A. parvodoxa* which has acute or obtuse phyllodes and more prominent stipules. *A. congesta* subsp. *congesta* has longer glabrous phyllodes, and flower heads which may have more flowers and which may be arranged in racemes. *A. congesta* subsp. *wonganensis* occurs only in the Wongan Hills area. It has glabrous phyllodes and flower heads arranged in racemes.

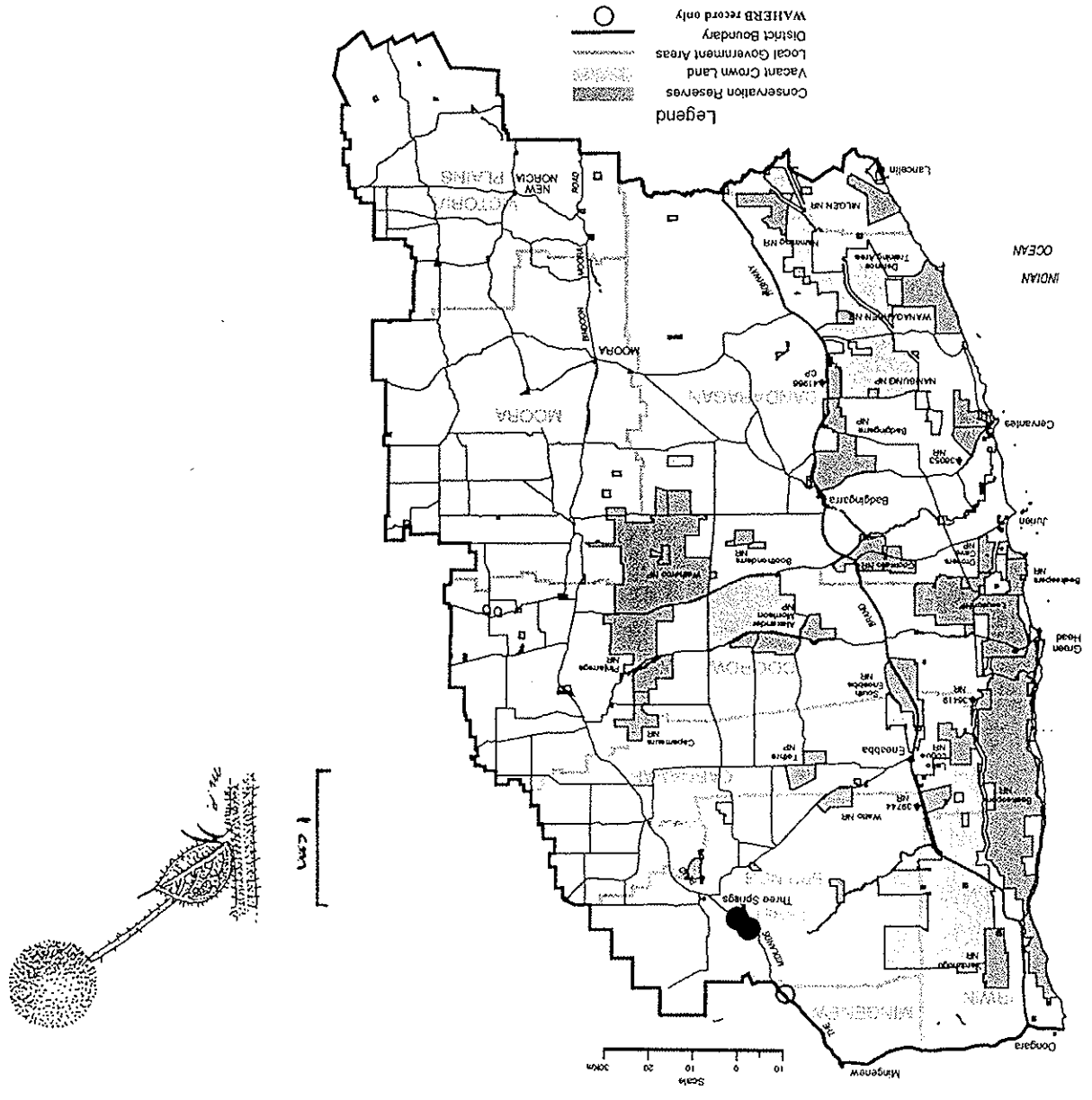
*Acacia congesta* Benth. subsp. *cliffontiana* (W. Fitzg.) Maslin ms MIMOSACEAE

**Research Requirements**

— Further survey is required particularly in suitable habit on conservation reserves in the Arimo to Yandanooka area.

**References**

Fitzgerald (1904), B. Maslin (personal communication).



● *Acacia congesta* subsp. *cliftoniana* ms

## MIMOSACEAE

*Acacia flabellifolia* W. Fitzg.

This species was first collected by W. V. Fitzgerald in 1903 from Arrino and was described by him in 1904. A spreading shrub to 1 m tall, *Acacia flabellifolia* has rigid, undulate phyllodes ending in a long, pungent point. The upper margin is rounded and the principal nerve runs close to the lower margin. The flower heads are globular and solitary and the legumes are tightly coiled.

*A. dilatata* is a species with similar phyllodes, and occurs within the range of *A. flabellifolia*, but is not closely related.

Flowering Period: August

## Distribution and Habitat in the Moora District

Has been recorded as occurring between Yandanooka and Watheroo, a geographic range of just over 100 km and it is at present known from four populations occurring between Arrino and Watheroo.

It grows in rocky or lateritic loam on low hills in open eucalypt woodland. Associated species include *Eucalyptus wandoo* and *E. loxophleba*.

## Conservation Status

Current: Priority 1

## Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. North of Watheroo	Mo	-	19.8.1973	-	-
2a. * SE of Arrino	TS	MRWA Road Reserve	10.7.1991	2+	Good
2b. SE of Arrino	TS	MRWA Road Reserve	10.7.1991	4	Weed invaded, some plants dead
3a. SW of Three Springs	TS	Nature Reserve	10.7.1991	10+	Good
3b. SW of Three Springs	TS	Nature Reserve	22.10.1992	10+	Undisturbed
4. SW of Watheroo	Mo	Private	16.10.1991	40 est.	Undisturbed
5. * Yandanooka	MI	-	14.9.1904	-	-

## Response to Disturbance

Unknown

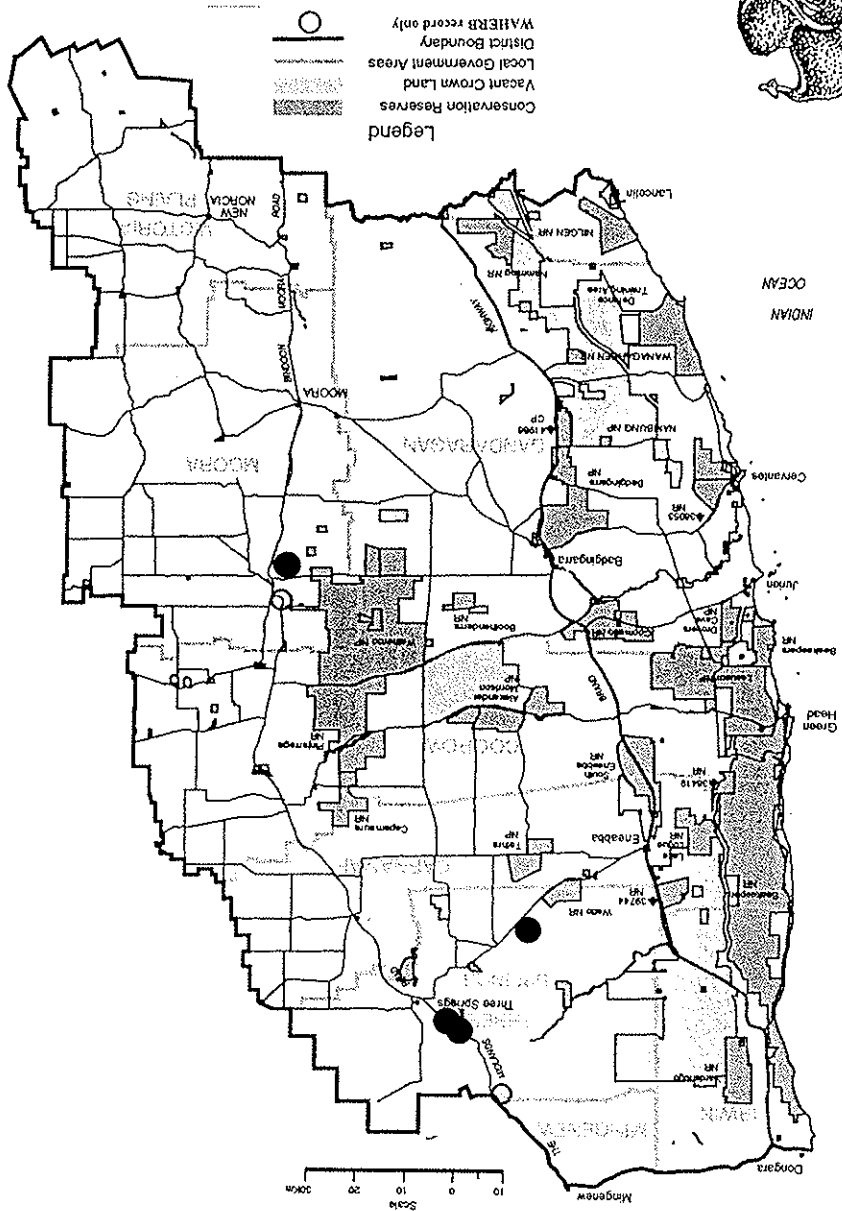
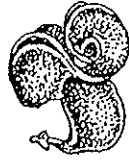
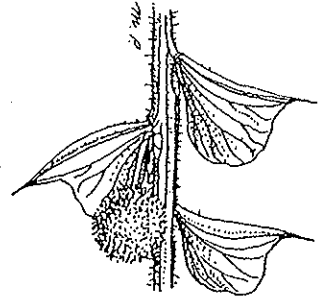
Susceptibility to *Phytophthora* Dieback

Unknown

## Management Requirements

- Survey required.
- Ensure that dieback hygiene procedures are carried out at all populations.

*Acacia flabellifolia*



References  
 Fitzgerald (1904), B. Maslin (personal communication).

- Research Requirements
- Further survey is required in the area of population 4, to obtain accurate location information and to determine whether a further population occurs nearby.
  - Further survey required, particularly on the eastern side of Watheroo National Park to re-find population 1 and on the Yandanooka townsite, population 5.

This species was first collected by Blackall in 1940 from Three Springs. *Acacia lanceolata* ms is a much-branched shrub to 1 m tall. The branchlets are spinose, with lanceolate to phyllodes, 7-13 mm long and 1.5-4 mm wide, each with a pungent point. The flower heads are globose to shortly oblongoid and the legumes are tightly coiled.

Flowering Period: August-September

**Distribution and Habitat in the Moora District**

Has been collected from Arrino northwards into the Geraldton District east of Mingnew. Two populations have been located recently but as the species was not included on the Priority Flora List until late during this survey, no others have been found. Grows on low hills, usually on laterite, in eucalypt woodland or tall shrubland of *Allocasuarina* species.

**Conservation Status**

Current: Priority 1

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1 * N of Three Springs	TS	Shire Road	30.8.1982	Moderately	Uncommon in adjacent disturbed woodland
1. NE of Arrino	TS	-	2.12.1991	Common-WH	Undisturbed
2. W of Three Springs	TS	Nature Reserve	26.7.1994	-	-
1 * NW of Three Springs	TS	Road Reserve	22.11.1983	Common-WH	Disturbed

**Response to Disturbance**

It was noted that population 1 was common on the road verge but not in adjacent undisturbed vegetation.

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

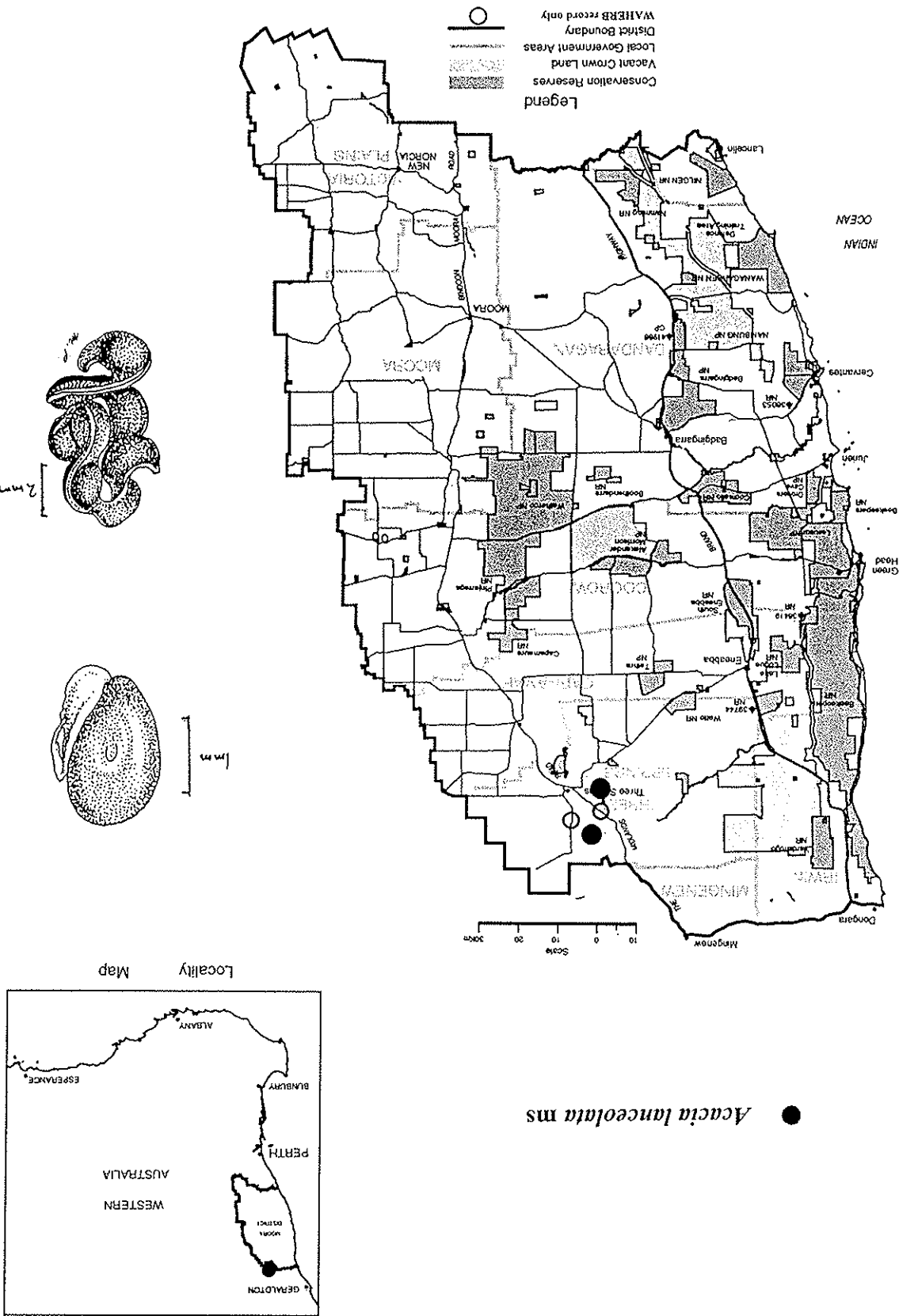
**Research Requirements**

- Further survey is required, particularly to survey fully populations 2 and 3 and to resurvey populations 1 and 4.

**References**

B. Maslin (personal communication).

*Acacia lanceolata* ms



- Ensure that markers are in place at all road verge populations.
- Ensure that dieback hygiene procedures are carried out at all populations.

#### Management Requirements

Unknown

#### Susceptibility to *Phytophthora* Dieback

Unknown

#### Response to Disturbance

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Morowa	-	Telstra Reserve	25.9.1990	24	Partly disturbed
2. SW of Morowa	-	-	16.8.1990	-	-
3. E of Carnamah	TS	Shire Road Reserve	19.9.1991	15	Disturbed, weed invasion
4. E of Carnamah	TS	Shire Road Reserve	19.9.1991	20	Disturbed
5. E of Carnamah	TS	Shire Road Reserve	19.9.1991	30+	Disturbed, weed invasion
6. N of Carnamah	TS	Shire Road Reserve	19.9.1991	100+	Disturbed, weed invasion
7. N of Carnamah	TS	Shire Road Reserve	19.9.1991	5	Disturbed, weed invasion
1* E of Carnamah	TS	-	28.9.1990	-	-
2* SW of Morowa	Ca	-	1.9.1976	-	-

#### Populations Known in the Moora District

Conservation Status  
Current: Priority 1

This species is known from east of Carnamah north to the boundary of the Moora District south-west of Morowa over a range of ca. 40 km. Eight populations have been reported from the Inering Creek Catchment, which is within the known range of the species. These are not listed below.

Grows amongst laterite, chert or granite rocks on low hills, in brown loam or clay soils. Occurs in open low scrub and associated species include species of *Melaleuca*, *Acacia* and *Allocasuarina*.

#### Distribution and Habitat in the Moora District

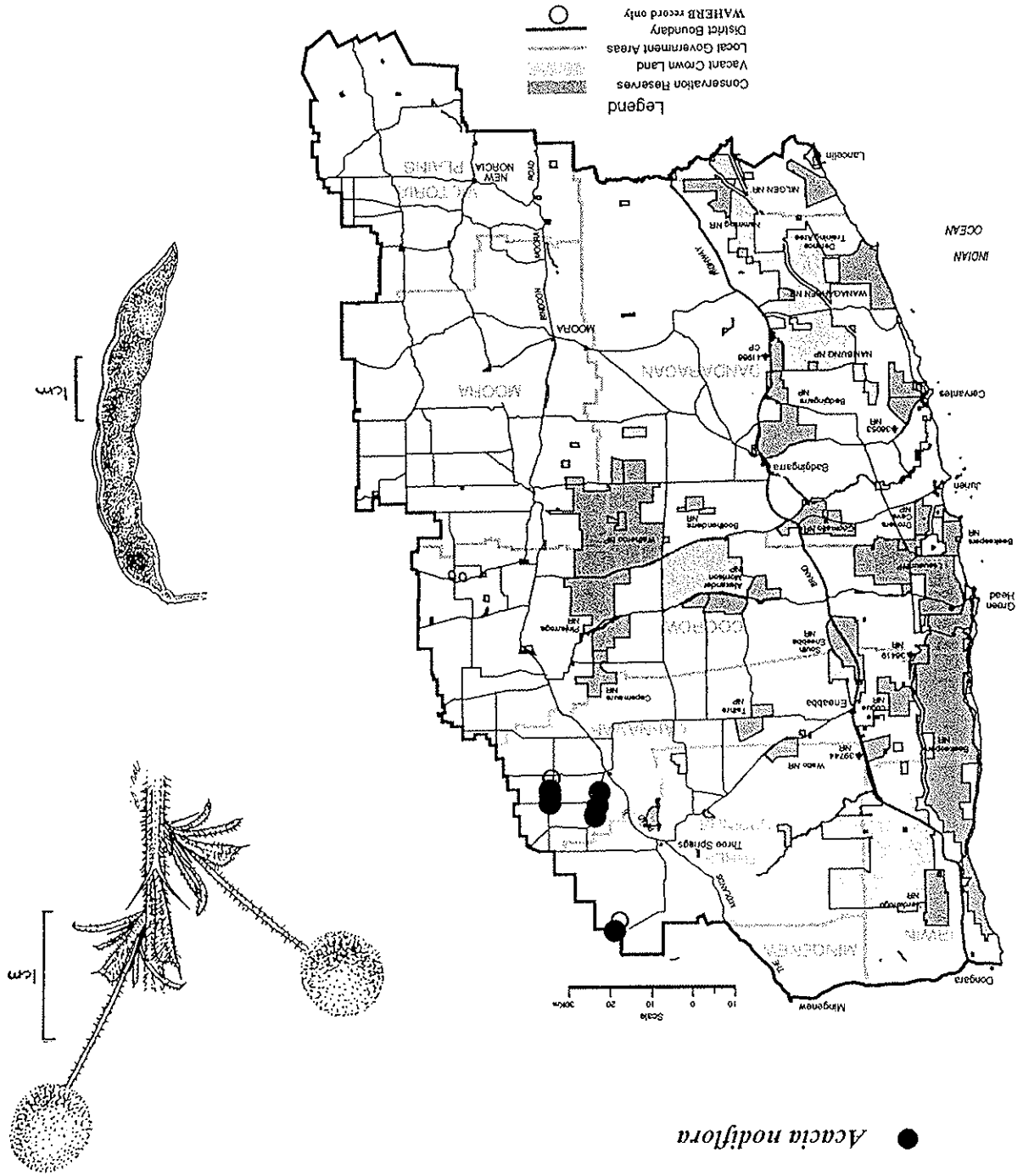
Flowering Period: August-September

*Acacia nodiflora* is a diffuse shrub to 2 m tall. The phyllodes are grouped in bundles, with up to seven phyllodes in each. They are linear to narrowly oblong, 7-13 mm long, 0.5-1.5 mm wide. There is a pair of spiny stipules at each cluster of phyllodes. The flower heads are globose to widely ellipsoid, golden in colour and 5-7 mm in diameter. They are borne on peduncles 1-2 cm long and are grouped 1-3 per node. The legumes are up to 6.5 cm long, 7-8 mm wide.

This species was first collected by James Drummond from "Swan River" and later described from these collections by Bentham in 1855. The next collection of the species was made by W.E. Blackall in 1940 and only four collections were made subsequently until it was surveyed in 1991.

*Acacia nodiflora* Benth.

MIMOSACEAE



Bentham (1855), B. Maslin (personal communication).

**References**

— Further survey is required, particularly in the Inering Creek Catchment, to obtain voucher specimens and population information for the populations reported from that area.

**Research Requirements**



Lake Logue Wattle

This undescribed species was first collected in 1981. It is a dense rounded shrub to 4 m tall. The branchlets are longitudinally striped alternately with hairless, often green epidermis and brown pubescent bands. The phyllodes are narrowly oblong elliptic, to 5.5 cm long, and 7 mm wide. They are stiff and have raised nerves. The flower heads are golden in colour and globular in shape. The legumes are up to 4 cm long, 4-5 mm wide.

Flowering Period: July-August

## Distribution and Habitat in the Moora District

This species occurs near Eneabba and has been recorded from two localities 40 km apart.

It grows on sand and clay-loam soils, on the margins of seasonal lakes in open low forest or low woodland. Associated species include *Casuarina obesa*, *Melaleuca* sp. and *Hibiscus* sp. It has also been recorded growing in sandy loam on limestone in mallee scrub heath at the northerly populations.

## Conservation Status

Current: Priority 1

## Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1 * SW of Eneabba	Ca	-	25.2.1981	-	-
1. SW of Eneabba	Ca	?Stockroute Reserve	27.8.1992	10,000+	Undisturbed
1 * Arrowsmith	I	-	3.7.1985	-	-
1. SW of Eneabba	Ca	?Stockroute Reserve	27.8.1992	100+	Undisturbed
2. SW of Eneabba	Ca	?Stockroute Reserve	27.8.1992	100+	Undisturbed
3. Arrowsmith	I	?Rail Reserve	2.7.1992	1	Partly disturbed

## Response to Disturbance

Unknown

Susceptibility to *Phytophthora* Dieback

Unknown

## Management Requirements

- Confirm land status for all populations and inform land managers where necessary.
- Ensure that dieback hygiene procedures are carried out at all populations.

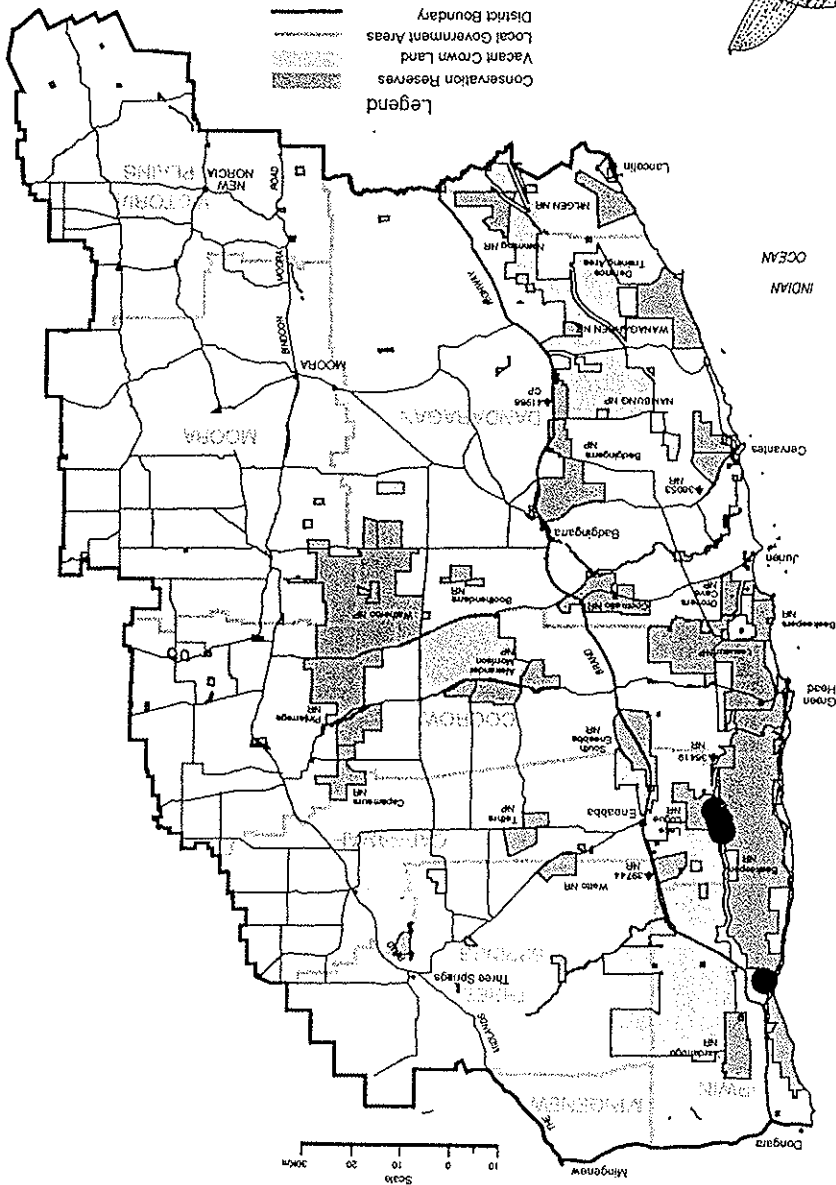
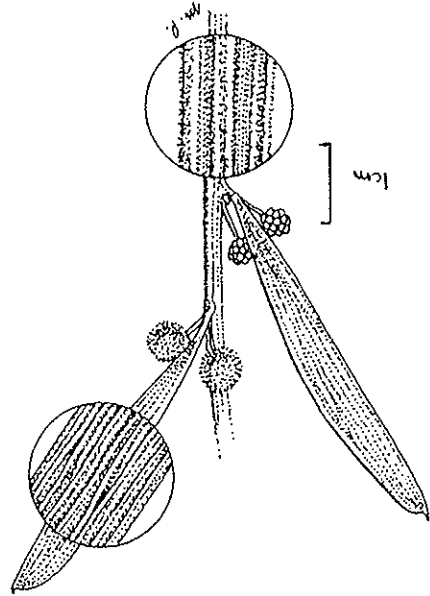
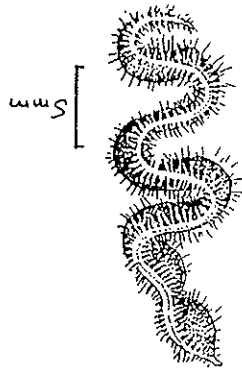
## Research Requirements

- Further survey is required, particularly to establish the full extent of populations 4 and 5 and to obtain accurate grid references.
- Populations 1 and 3 need to be re-found and fully surveyed.

## References

B. Maslin (personal communication).

*Acacia vitata* ms



Legend  
 Conservation Reserves  
 Vacant Crown Land  
 Local Government Areas  
 District Boundary

## EPACRIDACEAE

*Andersonia longifolia* (Benth.) L. Watson

*Andersonia longifolia* was first collected by Drummond and later described by Benth in 1869 as *A. latiflora* var. *longifolia*. It was recognised as a distinct species by L. Watson in 1962. There have been only five subsequent collections of the species, one last century by Gilbert, the others between 1979 and 1989.

*A. longifolia* is an erect shrub to 50 cm tall. The leaves are grey in colour, up to 17 mm long and 1-5 mm broad at the base. They are undulate and twisted, with long tapering tips which are spreading or incurved. The inflorescences are oblong and terminal, usually with more than 20 flowers in each. The bracts in the lower part of the inflorescence are leaf-like and may be longer than the flowers. The calyx is 10-15 mm long and is longer than the corolla, which is white and has lobes as long as, or longer than the tube. It is shortly hairy inside the tube and on the lower part of the lobes. The anthers are linear-oblong in shape and are equal to or exceeding the filaments, which are hairless on the external surface and densely hairy on the inner surface.

Flowering Period: March-May

## Distribution and Habitat in the Moora District

The earliest two collections of this species are without locality information but it is likely that they are from the Lesueur area, from which the other collections have been made. The species has been found over a narrow geographic range of only ca. 6 km. It has been recorded growing in low open heath and shrubland on upland or slopes beneath breakaways of Lesueur sandstone, in grey sand, grey-brown sandy gravel or sandy loam soils.

## Conservation Status

Current: Priority 1

## Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. * NW of Mt Lesueur	D	National Park	22.11.1979	-	-
2. * NE of Mt Peron	Co	National Park	22.4.1989	-	-
3. * S of Mt Peron	D	National Park	21.5.1981	Locally common-WH	-

## Response to Disturbance

Unknown

Susceptibility to *Phytophthora* Dieback

Presumed susceptible

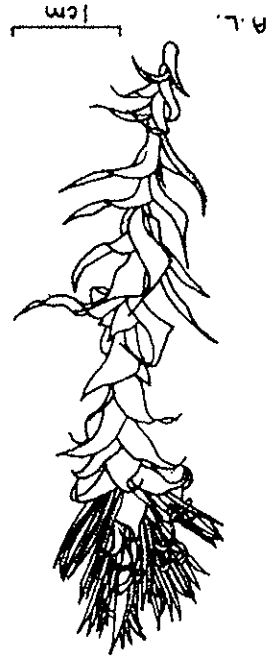
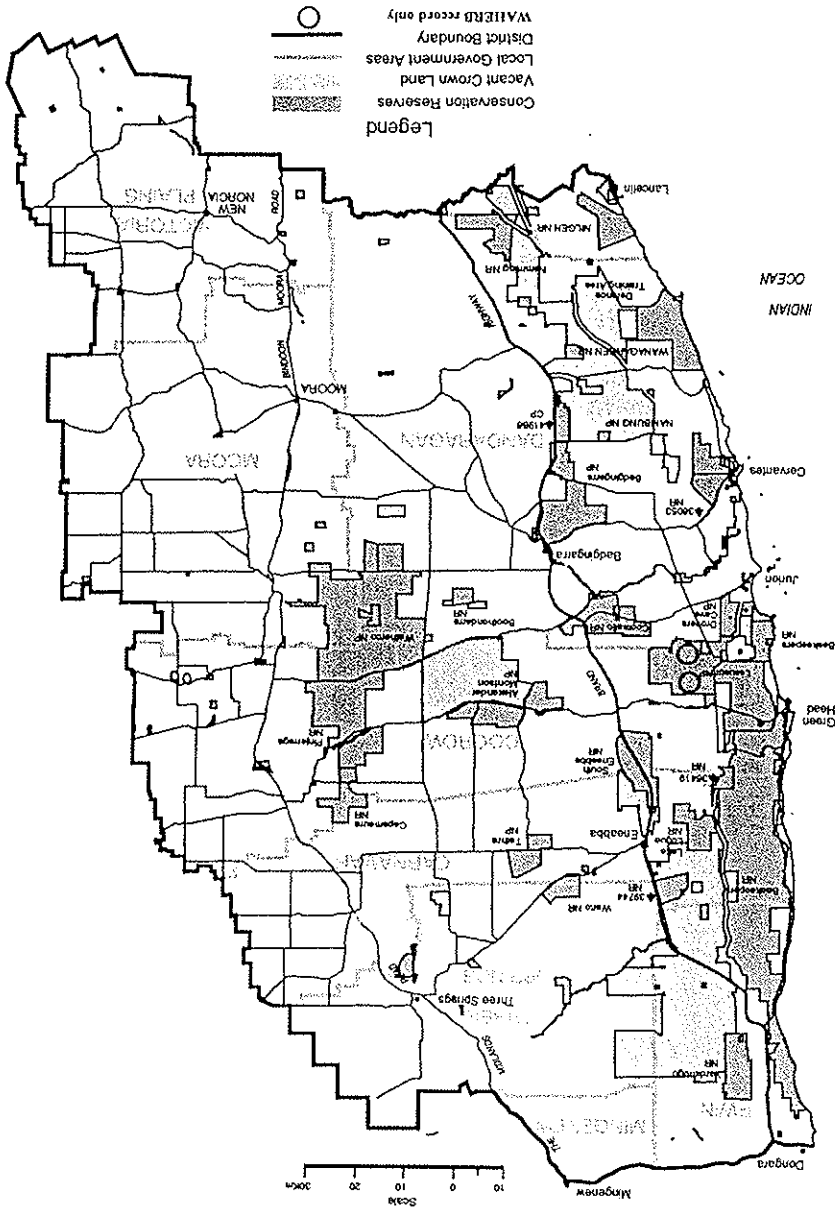
## Management Requirements

- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

## Research Requirements

- Further survey is required.

*Andersonia longifolia*



References  
Benham (1869), Watson (1962).

- Ensure that markers are in position at population 1.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

#### Management Requirements

Unknown

#### Susceptibility to *Phytophthora Dieback*

Unknown

#### Response to Disturbance

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. S of Greenhead Road	Co	MRWA Road Reserve	6.11.1992	27	Partly disturbed
2. SSE of Cervantes	D	-	22.11.1992	-	-
3. Coomallo	D	Nature Reserve	6.11.1988	-	-
1.* N of Badgingarra	D	-	3.11.1962	-	-
2.* SSE of Eneabba	Co	-	17.10.1978	-	-

#### Populations Known in the Moora District

Conservation Status  
Current: Priority 1

This species is endemic to the Moora District in the Eneabba to Badgingarra area. It grows on lateritic grey sandy soils in low scrub or heath. Associated species at population 1 included *Adenanthos cygnorum*, *Calothamnus quadrifidus*, *Hakea obliqua* and *Xanthorrhoea* sp.

#### Distribution and Habitat in the Moora District

Fruiting Period: November-December

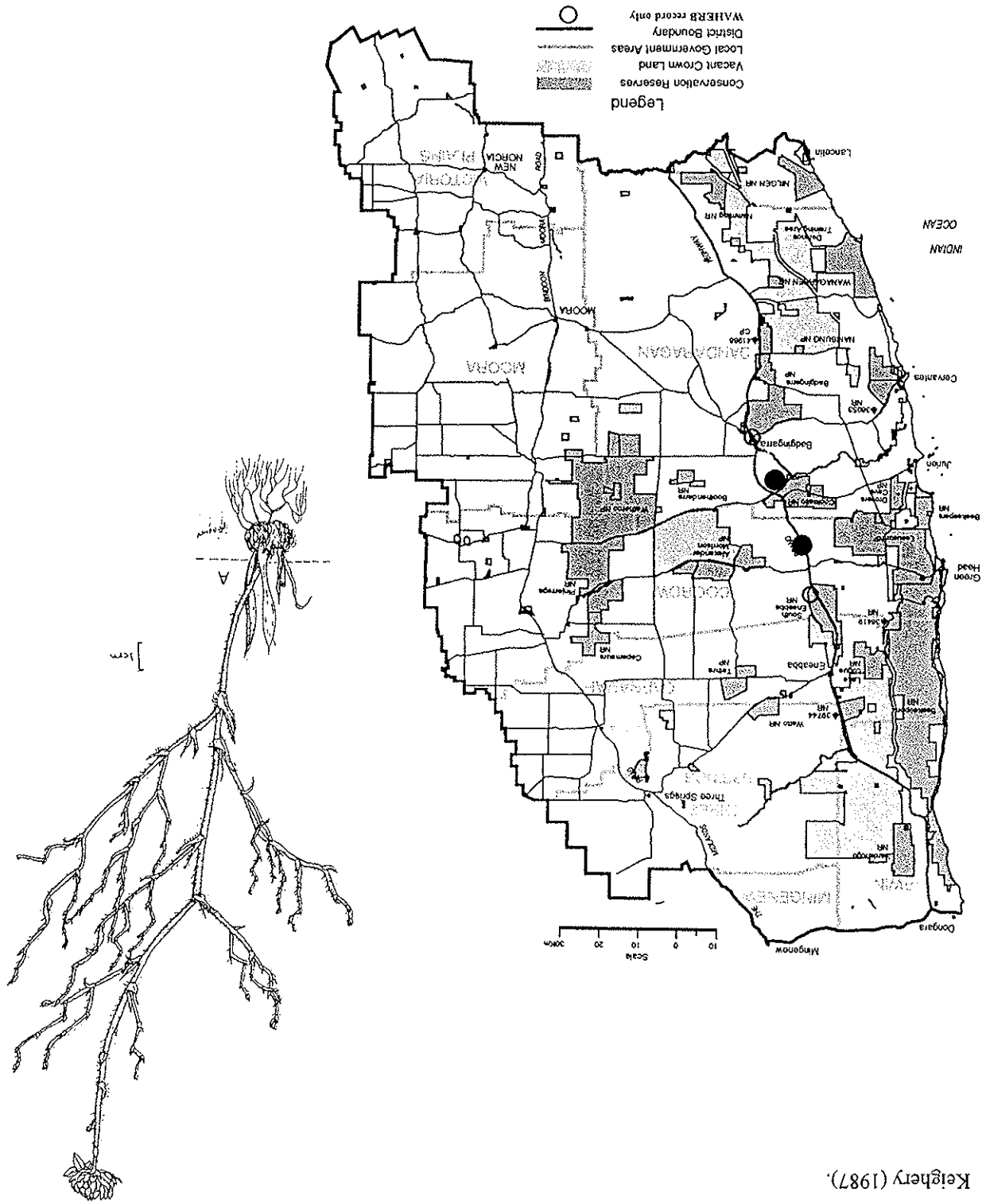
Flowering Period: October-November

Differs from *A. drummondii* and *A. preissii* in the presence of numerous, short, sterile branchlets on the flowering stems. This species is a perennial herb, with a short creeping rhizome covered in dense woolly hairs. The leaves are linear, 20-40 mm long, with sheathing bases, arising from the rhizome. The flowering stems are up to 35 cm long, with many short, sterile side branches. The flowers are borne in terminal condensed spikes. Each flower has six purple perianth segments and is ca. 20 mm in diameter. *Arrocrium gracillimum* is known from four collections made in the Eneabba area, the first collected by Royce in 1962. It was described by Keighery in 1987.

#### *Arrocrium gracillimum* Keighery

#### ANTHERICACEAE

*Arnocrinum gracillimum*



References  
Keighery (1987).

Research Requirements  
— Further survey is required, particularly to re-find and fully survey populations 2, 3, 4 and 5, and to re-find within the Badgingarra National Park.

*Chortzema humile* is a small, prostrate shrub to ca. 60 cm diameter. The leaves are alternate, obovate and mucronate at the apex, 4-16 x 2.5-5 mm, tapering at the base into a short petiole, which has a pair of persistent stipules ca. 1 mm long. There are terminal racemes to 18 cm long with up to 30 flowers on pedicels to 2.5 mm long. The calyx is lobed, the two upper lobes joined to form a lip with free tips. It is tapered at the base and has hairs of uniform length and colour. The petals are yellow with red-brown markings. The standard petal is up to 9 mm long, the wing petals are gently curved, to 8 mm long and the keel is acuminate, almost as long as the wings. The style is gently incurved.

This species is similar to *C. parviflorum* which has narrow to linear leaves, and to *C. racemosum* which has spinescent branchlets and linear leaves with revolute margins.

*C. genistoides* differs in its erect or spreading, spinescent branches, fewer leaves, minute stipules, rounded calyx base, short keel and abruptly incurved style.

Flowering Period: July-September

**Distribution and Habitat in the Moora District**

This species has been collected from three localities within the Moora District from east of Dongara and in the Carnamah-Coorow area. It is also recorded from Dowerin in the Merredin District and from east of Geraldton in the Geraldton District. No populations were found during this survey.

It has been recorded as growing in red loam, sandy clay or clay soils. Composites are the only recorded associated species.

**Conservation Status**  
Current: Priority 1"

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1 * S of Carnamah	Ca	Road Verge	29.7.1961	-	-
2 * E of Coorow	Co	-	12.9.1966	-	-
3 * E of Dongara	I	-	12.7.1970	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

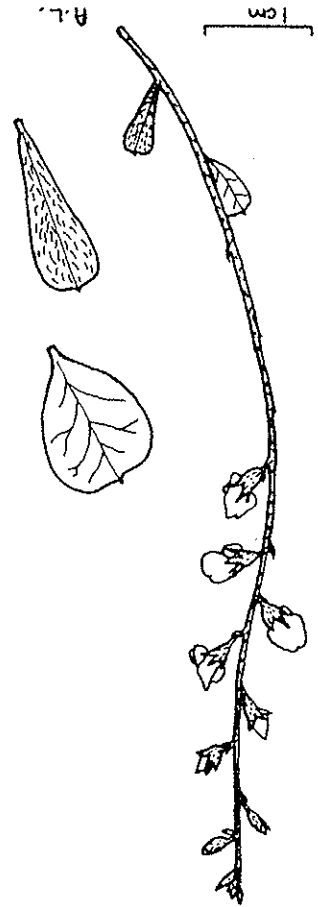
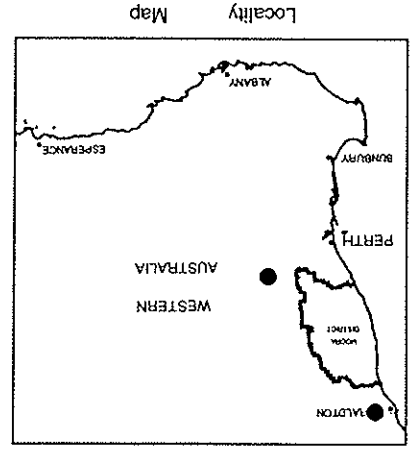
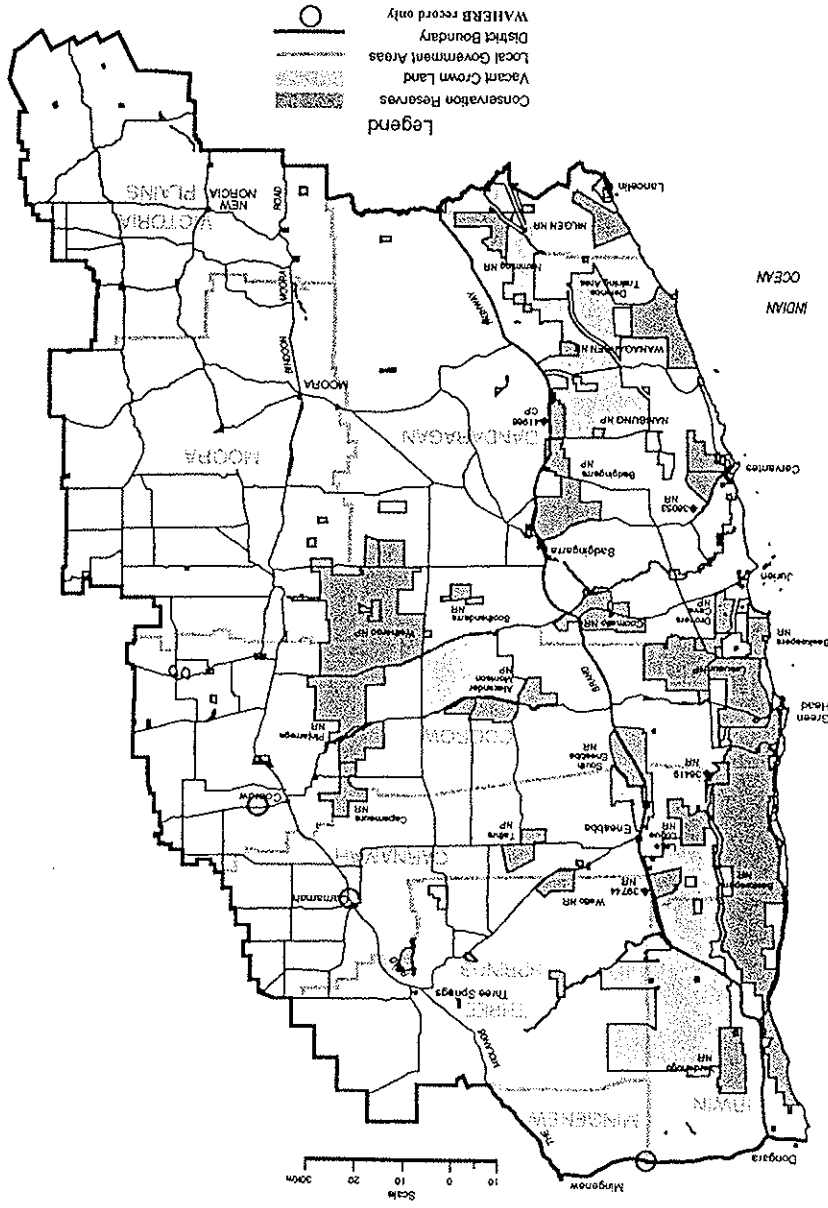
Presumed susceptible

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

# now Declared Rare Flora (updated at December 1999)

*Chortizema humile*



**Research Requirements**  
 - Further survey is required.

**References**  
 Taylor and Crisp (1992).



*Conospermum densiflorum* subsp. *unicephalatum* is an erect perennial shrub to 0.6 m, the stems and foliage with long, spreading hairs. The leaves are crowded, filiform, ca. 30-40 mm long, with white, spreading hairs. The peduncle is leafless, with a single head-like inflorescence which is almost globose and ca. 1.5 cm in diameter. The floral bracts are as long as the flowers, slender and hairy. The flowers are tubular and two-lipped, ca. 10 mm long, bluish-white in colour. Differs from *C. densiflorum* in the single head of flowers on each scape, rather than several (up to 10) heads forming a compact corymb.

Flowering Period: September-November

**Distribution and Habitat in the Moora District**

Has been recorded from near Gillingarra in the Moora District and also from near Gingin in the Swan Region. Grows in low lying clay soil. No populations have been found during this survey as it is a recent addition to the Priority Flora List. Few details of habitat have been recorded.

Conservation Status  
Current: Priority 1<sup>a</sup>

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
I. * S of Gillingarra	VP	-	24.9.1975	Common-WH	"Regrowth"

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

**Research Requirements**

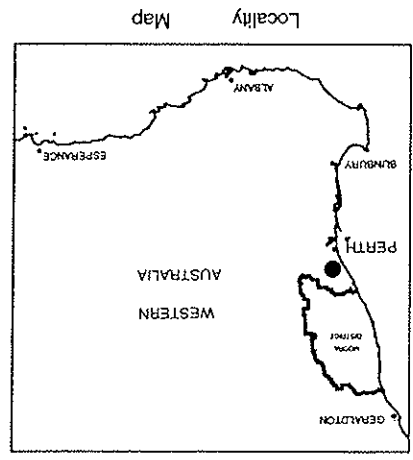
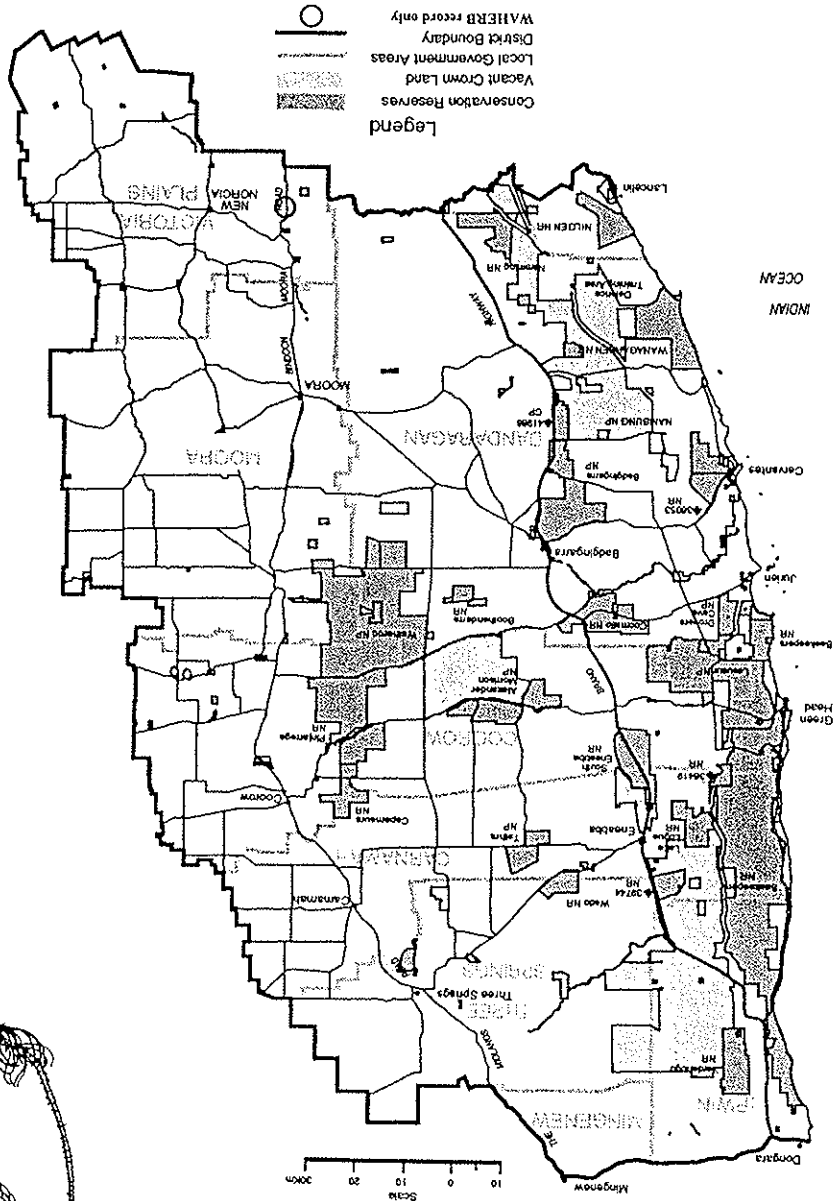
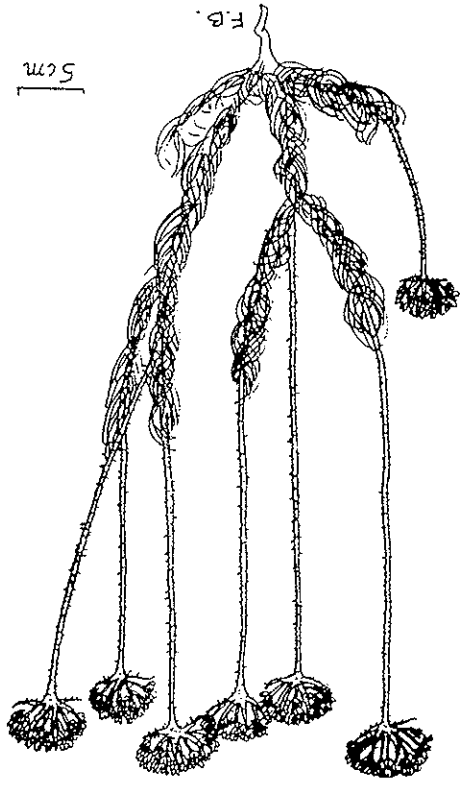
- Further survey is required.

**References**

Bennett (1995).

# now Declared Rare Flora (updated at December 1999)

*Conospermum densiflorum* subsp. *unicephalum*



*Conospermum scaposum* Benth.

## PROTEACEAE

Originally collected by Drummond, this species was described by Benham in 1870. It has been collected a few times since then from the 1960s onwards from the Catby to Mogumber area, and also from east of Narrogin. An erect, tufted perennial shrub to 90 cm in height, *Conospermum scaposum* has lanceolate leaves to 4 cm long, arising from the base of the plant. The flower heads are globose spikes, borne at the ends of the long leafless flowering stems. The flowers are pale blue in colour, without stalks. The fruit is a cone-shaped achene.

**Flowering Period:** October-February

**Distribution and Habitat in the Moora District**

The species has been recorded over a geographic range of ca. 70 km in the Moora District from west of Mogumber to north of Catby. It is also known from east of Narrogin in the Narrogin District. It grows in yellow, grey or white sand over clay in tall shrubland, or in heath with *Banksia lemnataea* and *Melaleuca bracteosa* in seasonally wet areas or on gentle slopes above drainage lines.

**Conservation Status**  
Current: Priority I

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Wolka Road	D	Shire Road Reserve	9.1.1992	100+	Growing on graded road edge
2. Munbinea Road	D	Shire Road Reserve	5.8.1992	10+	Growing on graded road edge
3. Munbinea Road	D	Shire Road Reserve	5.8.1992	20+	Growing on graded road edge
1 * SW of Badgingarra	D	-	30.1.1969	-	-
2 * Wolka Road	D	-	6.11.1988	-	-
3 * W of Mogumber	D	-	27.1.1964	-	-

**Response to Disturbance**

Populations 1-3 were growing only on graded road edges with no plants seen in the undisturbed bush behind the graded road shoulder.

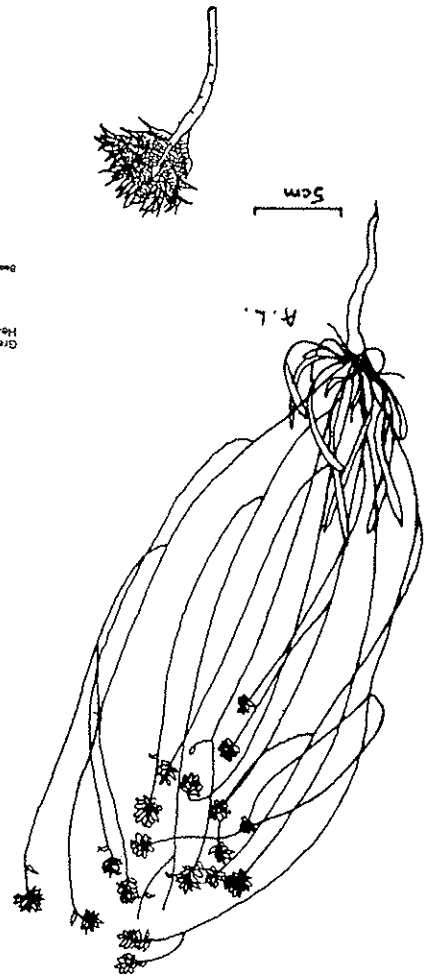
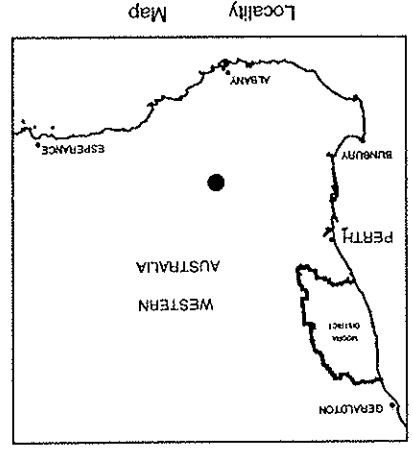
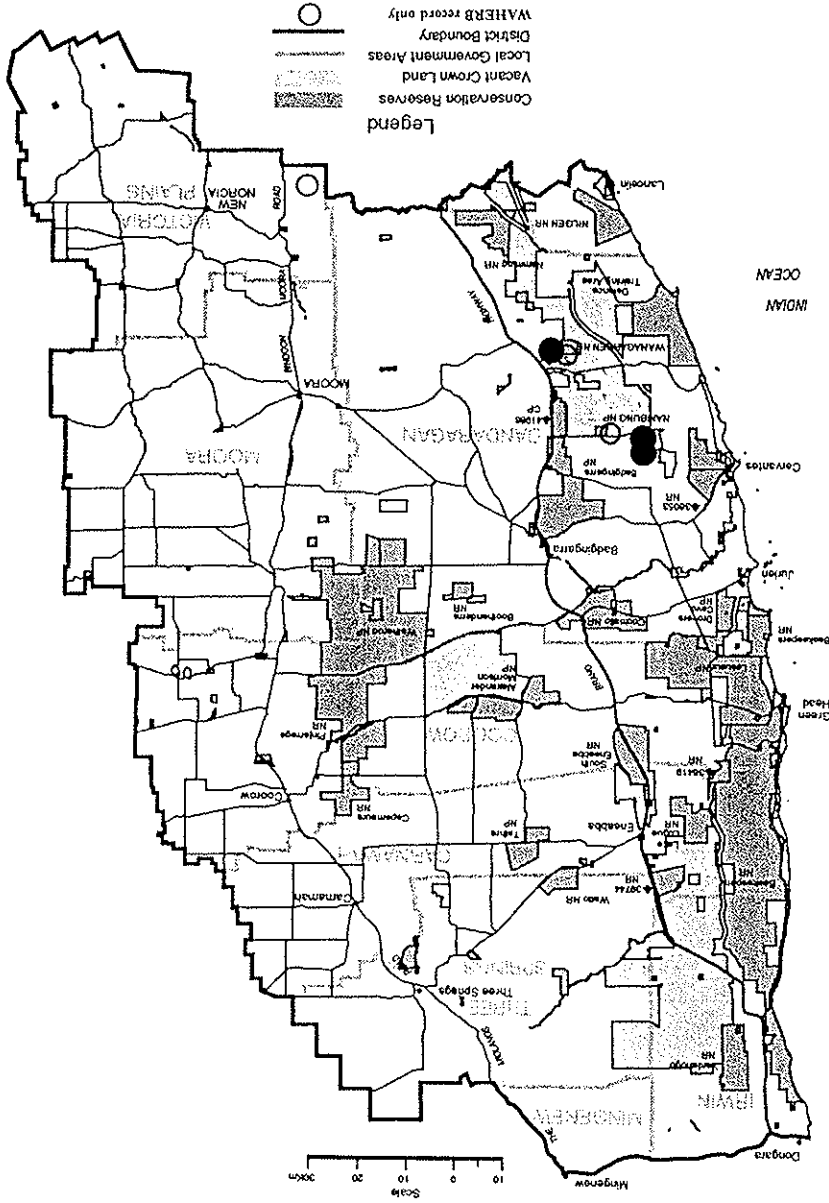
**Susceptibility to *Phytophthora Dieback***

Presumed susceptible

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that markers are in position at populations 1, 2 and 3.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

*Conospermum scaposum*



**Research Requirements**  
 - Further survey is required particularly on disturbed areas of conservation reserves in the known areas of occurrence.

**References**  
 Bennett (1995), Bentham (1870), Leigh *et al.* (1984).

# now Declared Rare Flora (updated at December 1999)

- Monitor population 1.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

#### Management Requirements

Unknown

#### Susceptibility to *Phytophthora* Dieback

The population inspected in 1992 had been recently burnt in 1976 and was estimated then at <10,000 plants. There were few plants found in 1992.

#### Response to Disturbance

1. N of Irwin I Shire Road Reserve 7.8.1992 1+ Some weed invasion

Population Shire Land Status Last Survey No. of Plants Condition

#### Populations Known in the Moora District

Conservation Status  
Current: Priority 1<sup>#</sup>

Known from a restricted area formerly in the Moora District north-east of Dongara, where only one population has been recently found. Also recorded ca. 30 km further north in the Geraldton District. Grows in white or grey sand with lateritic gravel, in heath, open scrub, low open heath and low open woodland, in upland areas.

#### Distribution and Habitat in the Moora District

Flowering Period: July-August

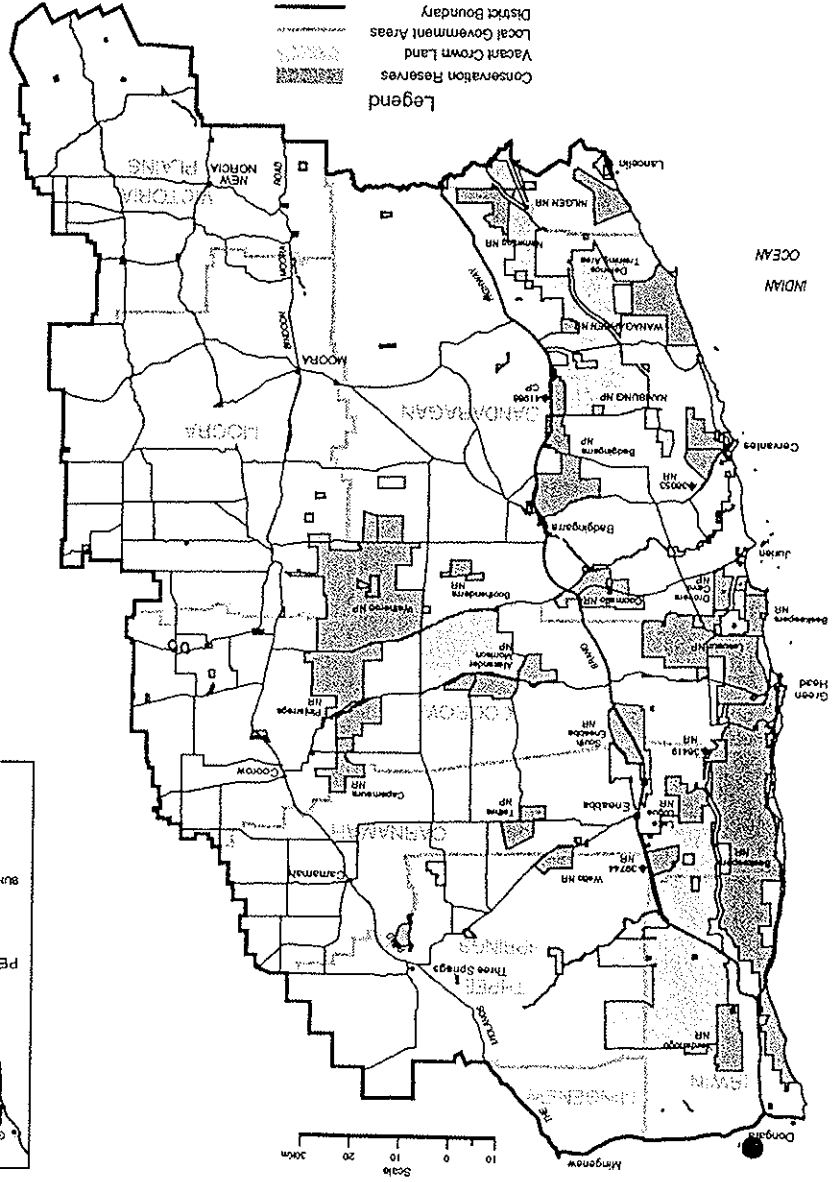
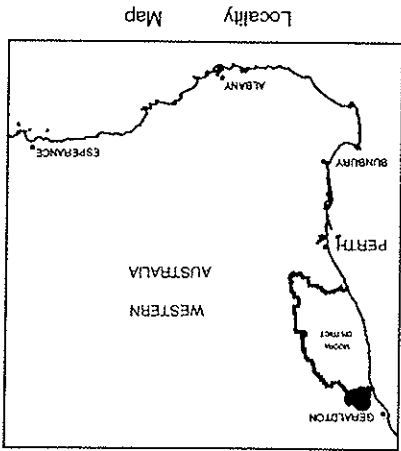
This subspecies is a tufted perennial herb to ca. 20 cm tall, with terete leaves, 13-33 cm long and less than 1 mm wide. The leaf bases are densely tomentose, the upper part of the leaf less hairy. The flowering stem is 4-10 cm long with a dense many-flowered inflorescence. The flower stalks are short. Each flower has the perianth joined for one third to half the length, the tube tapering below the lobes, and divided above into six lobes. It is cream in colour, 7.5-10 mm long, with a short densely matted covering of hairs. The persistent petal lobes on the fruit become claw-like, touching at the apex with gaps at the bases. The stamens are erect, in one row, shorter than the filaments, the connective dorsally decurrent from the base upwards, without appendages. The placenta has several reflexed ovules. Differs from *Conosyris dielsii* in the terete, not flat leaves, which are also slightly shorter. Also similar to *C. teretiuscula*, which has silvery, villous hairs on the leaves and numerous ovules on the sides and lower part of the placenta.

HAEMODORACEAE

*Conosyris dielsii* W. Fitzg. subsp. *teres* Hopper



● *Conostylis dielsii* subsp. *teres*



Hopper (1987).

References

— Further survey is required, populations 2 and 3 have not been refound despite recent searches.

Research Requirements

*Dampiera tephrea* Rajput & Carolin

GOODENIACEAE

An ascending to erect perennial to 60 cm tall, with a whitish or yellowish covering of dense hairs and terete stems. The leaves are sessile and flat, elliptic to obovate in shape, often dentate, hairless above, with a grey or yellowish tomentose lower surface, 15-47 mm long, 5-15 mm wide. The flowers are borne in a leafy inflorescence with several flowers on each axillary branch. The axillary branches are 9-20 mm long, with two or three growing from the same point on the stem. The corolla is 10-12 mm long, dark blue in colour, tomentose with long, grey, plumose hairs mixed with shorter, stouter hairs. The fruit is obovoid, to 4 mm long, slightly oblique.

This species is similar to *Dampiera salanea* which has white hairs on the lower surface of the leaves and stout, shorter grey hairs on the corolla. It is also similar to *D. alissima* which has greyish tomentose leaves becoming hairless above, and short, whitish corolla hairs.

Flowering Period: July-November

**Distribution and Habitat in the Moora District**

The species was described from collections made near Dongara and other populations have been recorded from Eneabba southwards on the western side of the Moora District south to Regans Ford.

Grows among heath or in open low woodland with scrub and low heath in sandy soil, sandy clay or loam.

**Conservation Status**

Current: Priority 1

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Catby	D	MRWA Road Reserve	30.7.1991	1	Disturbed
2. W of Dandaragan	D	Private	12.9.1988	-	-
3. Capitella Road	D	Water Reserve	10.9.1988	-	-
1. S of Badgingarra	D	-	1.11.1965	-	-
2. * Regans Ford	D	-	19.7.1978	-	-
3. * Greenhead	D	-	16.7.1986	-	-
4. * Dongara	I	-	12.8.1978	-	-
5. * N of Eneabba	?TS	-	12.8.1978	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

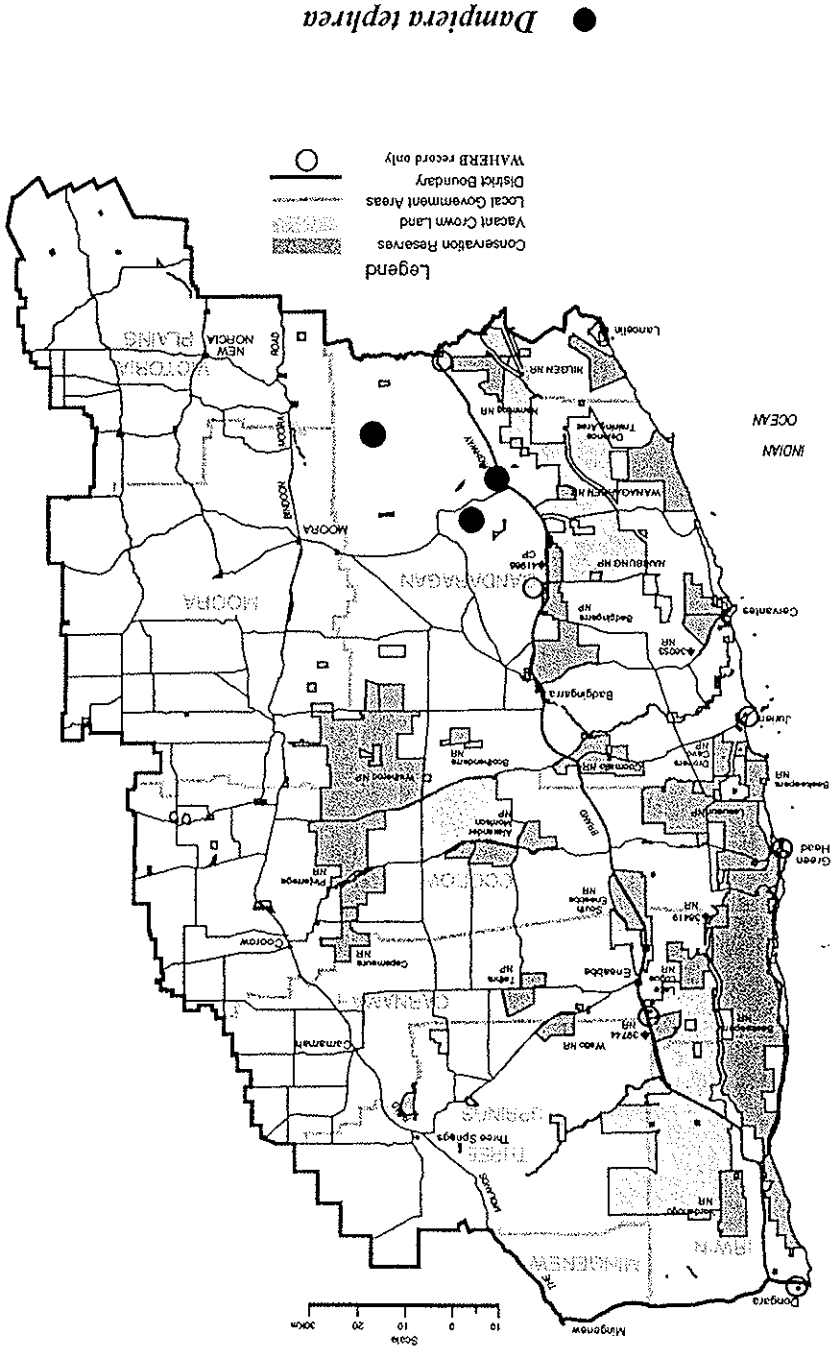
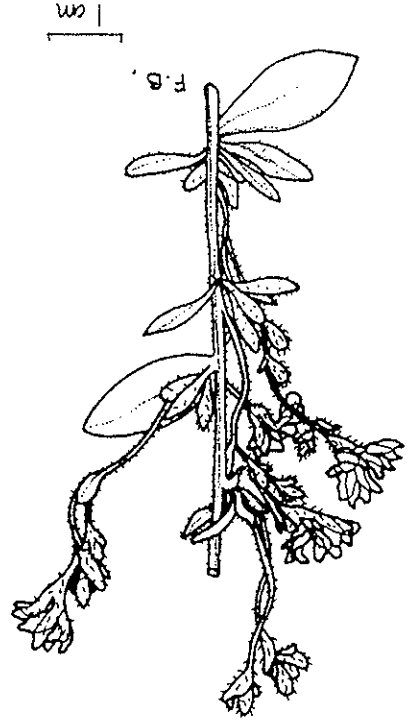
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

**Research Requirements**

— Further survey is required.

**References**

Rajput and Carolin (1992).





A low-domed multistemmed shrub to 0.6m tall and 3 m in diameter. The leaves are grey green, hairy, entire and linear, to ca. 7 mm long and ca. 0.5 mm wide. They are crowded along the upper stems, spreading at a wide angle. The flower heads are erect to nodding, each surrounded by long narrow bracts, reddish in colour but covered with stiff white hairs which give a hoary appearance. There are ca. 10 small tubular flowers with narrow petal lobes in each flower head. They are reddish in colour, each with a long curved style slightly shorter than the inflorescence bracts.

**Flowering Period:** September-December

#### Distribution and Habitat in the Moora District

Known from only one population south-east of Coorow where it occurs over ca. 400 m on both sides of a track. Occurs in woodland of *Eucalyptus gracilis* in red clayey loam or in shrubland and mallees with *Melaleuca* species and *Lachnostachys eritobotrya* in red sand and over broken rock. Also occurs in yellow soil in low flat areas of sandstone and limestone with *Acacia* and mallee *Eucalyptus*. Other associated species include *Acacia uncinata* and *Melaleuca uncinata*.

**Conservation Status**  
Current: Priority 1<sup>#</sup>

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Coorow	Co	Nature Reserve	24.9.1992	2000+	Undisturbed

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Unknown, but thought to be high.

#### Management Requirements

- Ensure that dieback hygiene procedures are carried out at population.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

#### Research Requirements

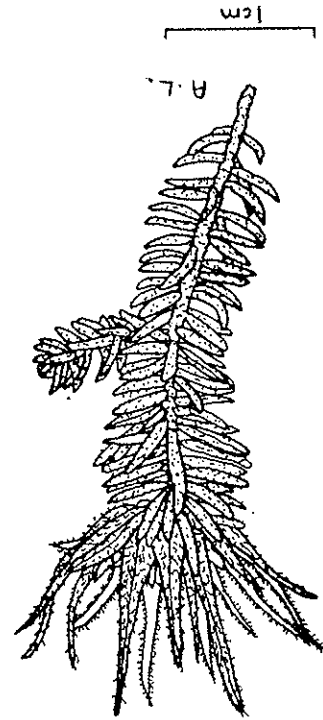
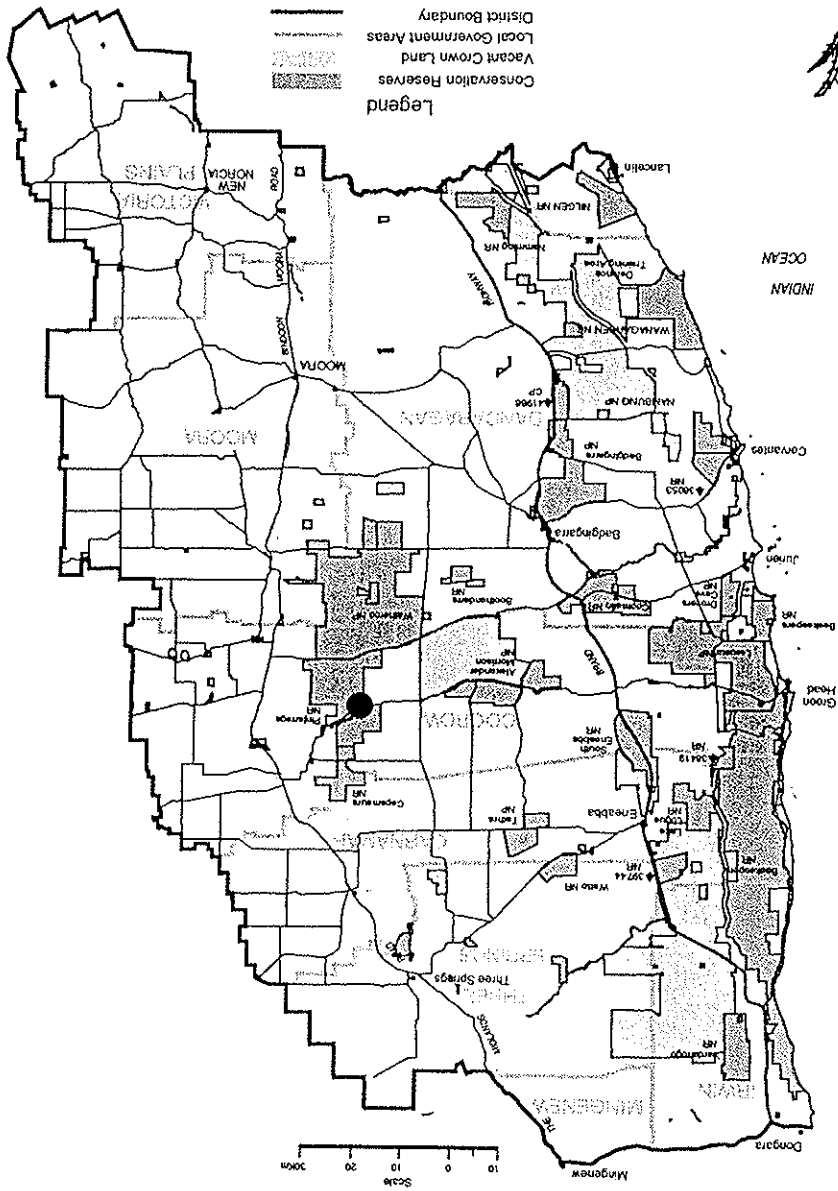
- Further survey is required, particularly in similar habitat in the nature reserve where it occurs.

#### References

N. Marchant (personal communication).

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

● *Darwinia chapmaniana* ms



*Darwinia* sp. Carnamah (J.Coleby-Williams 148)  
 MYRTACEAE  
 Harlequin Bell

A dwarf shrub to 60 cm tall, with simple, keeled leaves, 3-4 mm long, ca. 1 mm wide, crowded along the stems and appressed to them. The inflorescence is somewhat pendulous, surrounded by broad bracts, ca. 1-2 cm long, forming a "bell". The bracts are green, red and yellow in colour. There are several tubular flowers in each inflorescence, each ca. 5 mm long, with a long style.

Flowering Period: October

**Distribution and Habitat in the Moora District**

Known only from one population south of Carnamah.  
 Occurs in yellow clayey sand over laterite in open low scrub with *Melaleuca* sp., *Acacia ligulata*, mallee *Eucalyptus* and *Excoecarpus* sp.

Conservation Status  
 Current: Priority I<sup>a</sup>

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. S of Carnamah	Ca	Rail Reserve, MRWA Road Reserve	4.11.1992	26	Partly disturbed and weed infested

**Response to Disturbance**

Unknown, possibly a disturbance opportunist (D. Papenfuss, personal communication).

**Susceptibility to *Phytophthora* Dieback**

Unknown, but thought to be high.

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at population.
- Ensure that markers are present at the known population.
- Inform land managers of the presence of the population.
- Control weeds at the known population.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

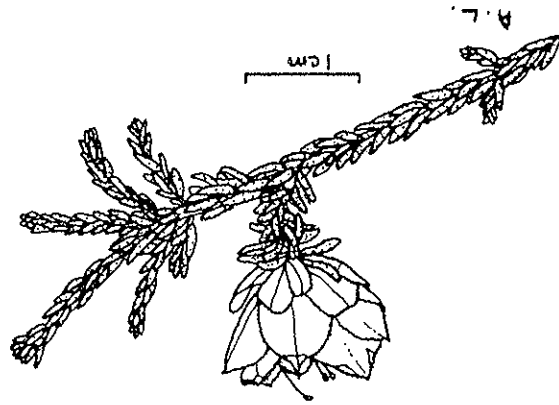
**Research Requirements**

- Further survey is required.

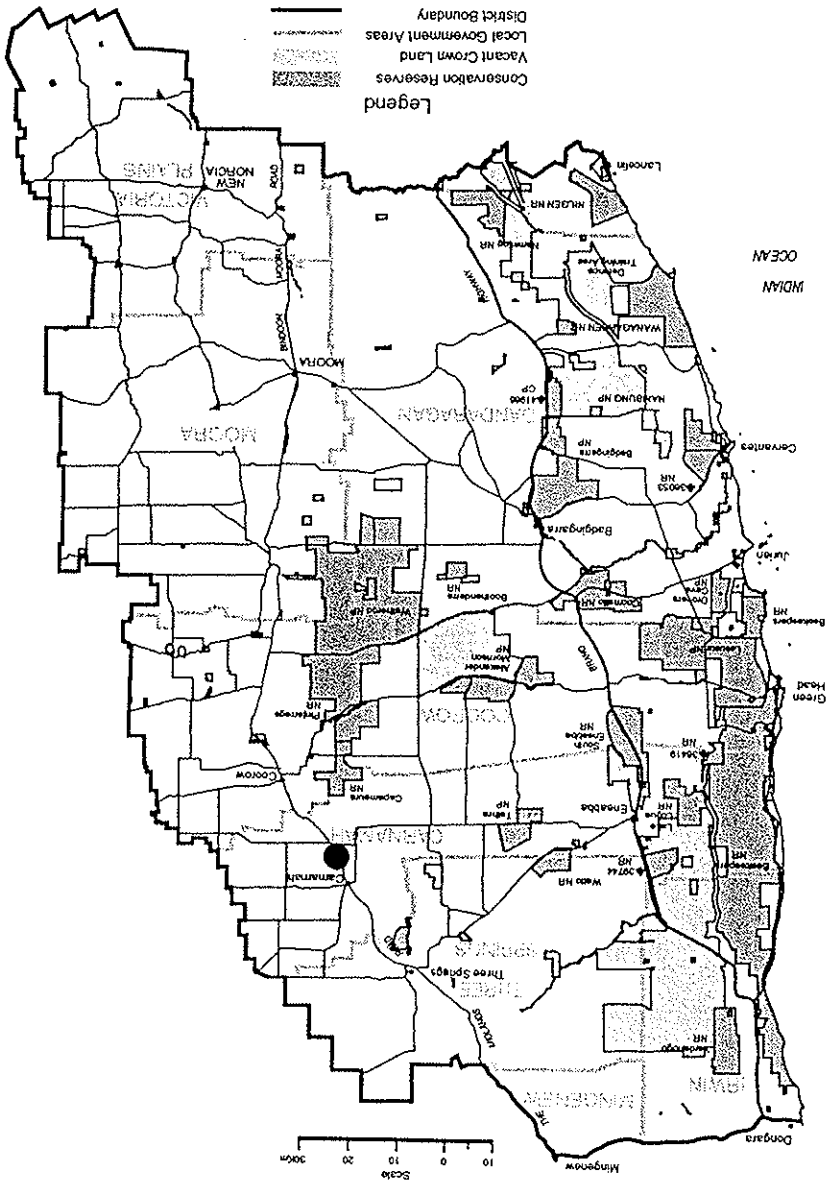
**References**

N. Marchant (personal communication).

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



● *Darwinia* sp. Carnamah (J.Coleby-Williams 148)



An erect shrub to 1.8 m tall and ca. 90 cm in diameter. The branchlets are narrowly winged, three-edged in cross-section, with the leaves reduced to scales. The flower buds are enclosed in prominent bracts at the base of the flower clusters which are closely spaced up the stems. There are 2-4 flowers in each cluster. They have short stalks and are orange-red with purplish markings. The standard petal is much larger than the wings and keel, 7-8 mm long and wide. The fruit is a thin, triangular pod 10-12 mm long.

Flowering Period: July-September

**Distribution and Habitat in the Moora District**

Endemic to the Moora District, occurring from the Lesueur area northwards to south-west of Eneabba. Grows on red clay loam and lateritic gravel or in gravely red-grey soil over ferruginous sandstone on slopes in low open heath, or sometimes in moist soils near creeks in open low wandoo woodland.

**Conservation Status**

Current: Priority 1

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Coorow-Greenhead Road	Co	MRWA & Shire Road Reserves	6.8.1992	1000+	Undisturbed
2. N of Coorow-Greenhead Road	Co	Shire Road Reserve	6.8.1992	100+	Plants growing in an area disturbed some years ago
1 * E of Mt. Peron	D	National Park	25.7.1980	-	-
2 * NNW of Mt Lesueur	D	National Park	6.11.1979	-	-
3 * ESE of Mt Peron	D	National Park	1.9.1989	-	-
4 * WSW of Eneabba	Ca	-	3.8.1976	-	-
5 * E of Mt Peron	Co	-	26.8.1949	-	-

**Response to Disturbance**

Population 2 grows in an area disturbed some years ago.

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

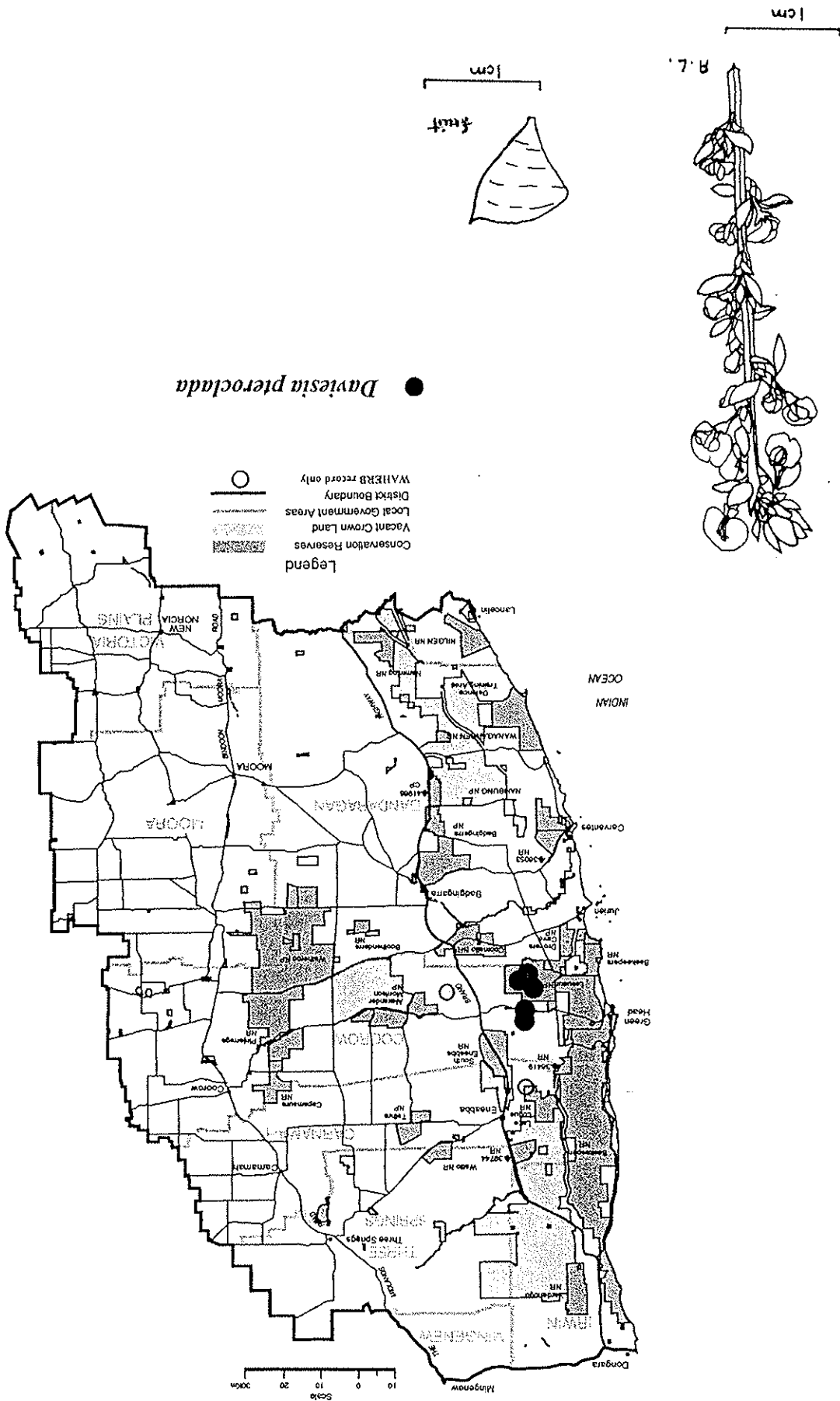
- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that markers are in place at both road verge populations.

**Research Requirements**

- Further survey is required particularly in the Lesueur National Park, to re-find populations 3-7.

**References**

Crisp (1985, 1995).



[*Diuris* sp. Three Springs (D.Jones s.n.)]

This species is related to *Diuris picta*. It has pale, almost white flowers with darker, purplish markings on the labellum.

Flowering Period: October-November

**Distribution and Habitat in the Moora District**

Known from two populations which occur ca. 1 km apart to the north-east of Eneabba.

It grows on a creek line in grey sand in open scrub of *Allocasuarina campestris* and *Acacia* sp. with heath to 1 m tall. Associated vegetation includes species of *Verticordia*, *Eremaea*, *Thyptomena* and *Jacksonia*.

**Conservation Status**

Current: Priority 1

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. NE of Eneabba	TS	Shire Road Reserve, Private	30.10.1994	5+ (22.10.1992)	Heavy weed infestation
2. NE of Eneabba	TS	Shire Road Reserve	3.10.1994	8	Undisturbed but with weed infestation

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown, but thought to be low.

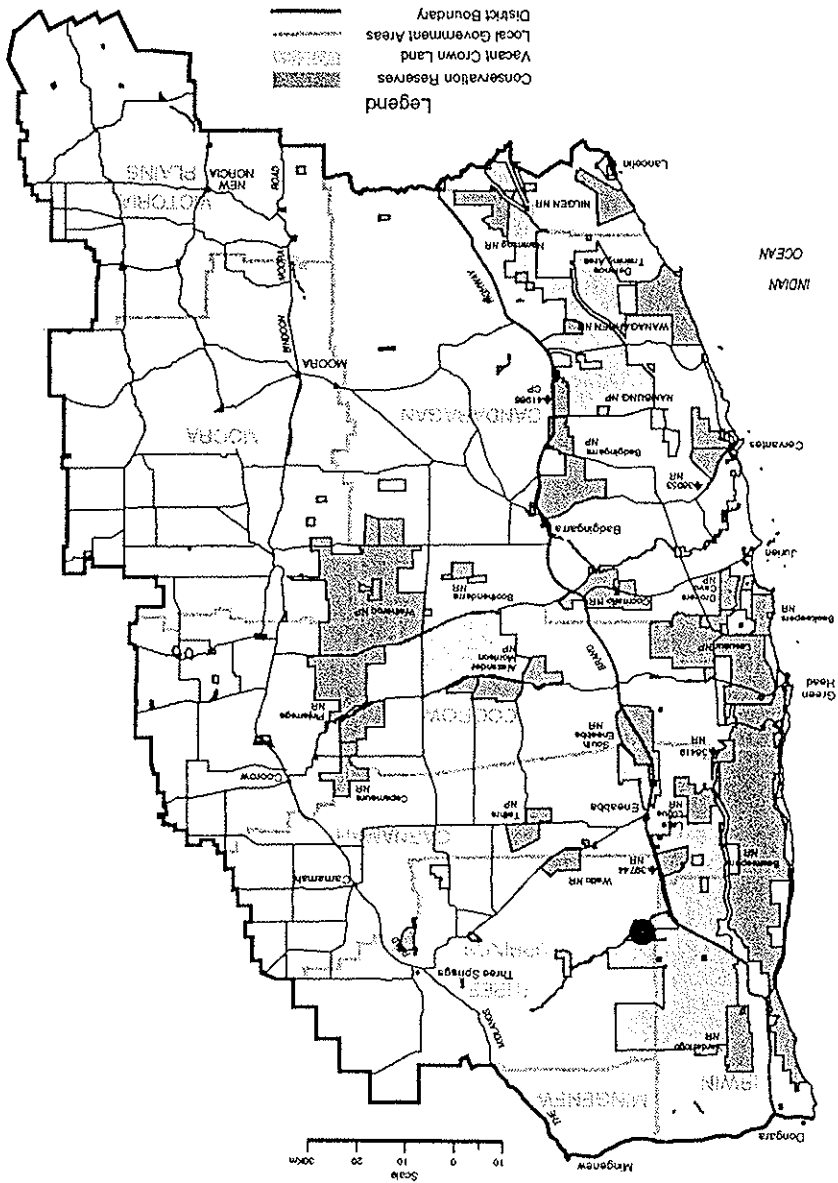
**Management Requirements**

- Continue liaison with land managers and others interested in the conservation of the species.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.
- Conduct weed control where necessary.

**Research Requirements**

- Further survey is required.

• *Duris tinkeri* ms





An erect tuberous herb to 50 cm tall, but often supported by associated plants. There is no basal rosette of leaves and the lower part of the unbranched stem has numerous brown, narrow, pointed bracts to 5 mm long, which have scattered stalkless glands. The upper part of the stem has 10 to 12 scattered leaves. Each leaf has a rounded, shallowly concave lamina to 4 mm in diameter, on a stalk ca. 10 mm long which is attached to the leaf at the centre of the lower leaf surface. The leaf has fringing stalked glands and smaller glands on the lamina surface. The inflorescence is a panicle at the top of the plant, with 5-10 flowers. The five, white petals are 15 mm long, 6 mm wide. There are three styles, branching twice into numerous terete segments, forming a tuft. Distinguished from *Drosera marchantii* subsp. *marchantii* by the presence of numerous bracts on the lower part of the stem rather than only on the upper part, and by the flower colour, which is white, not pink.

**Flowering Period:** June-July

**Distribution and Habitat in the Moora District**

Has been collected only from the type locality north of Cataby but has been observed to occur further northwards from this for ca. 50 km (A. Lowrie, personal communication).  
Grows in laterite-silica sand soils, on hill tops on open ground in heathland.

**Conservation Status**  
Current: Priority I

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Cataby	D	Private	23.6.1983	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at population.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

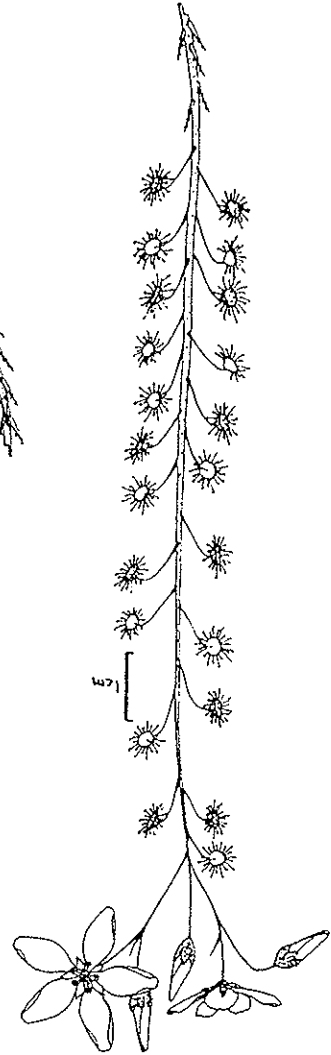
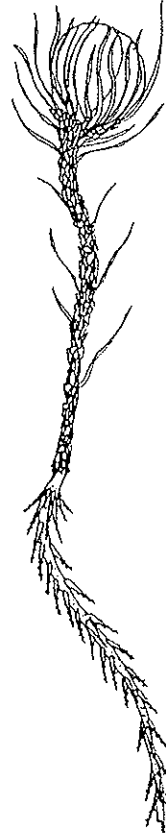
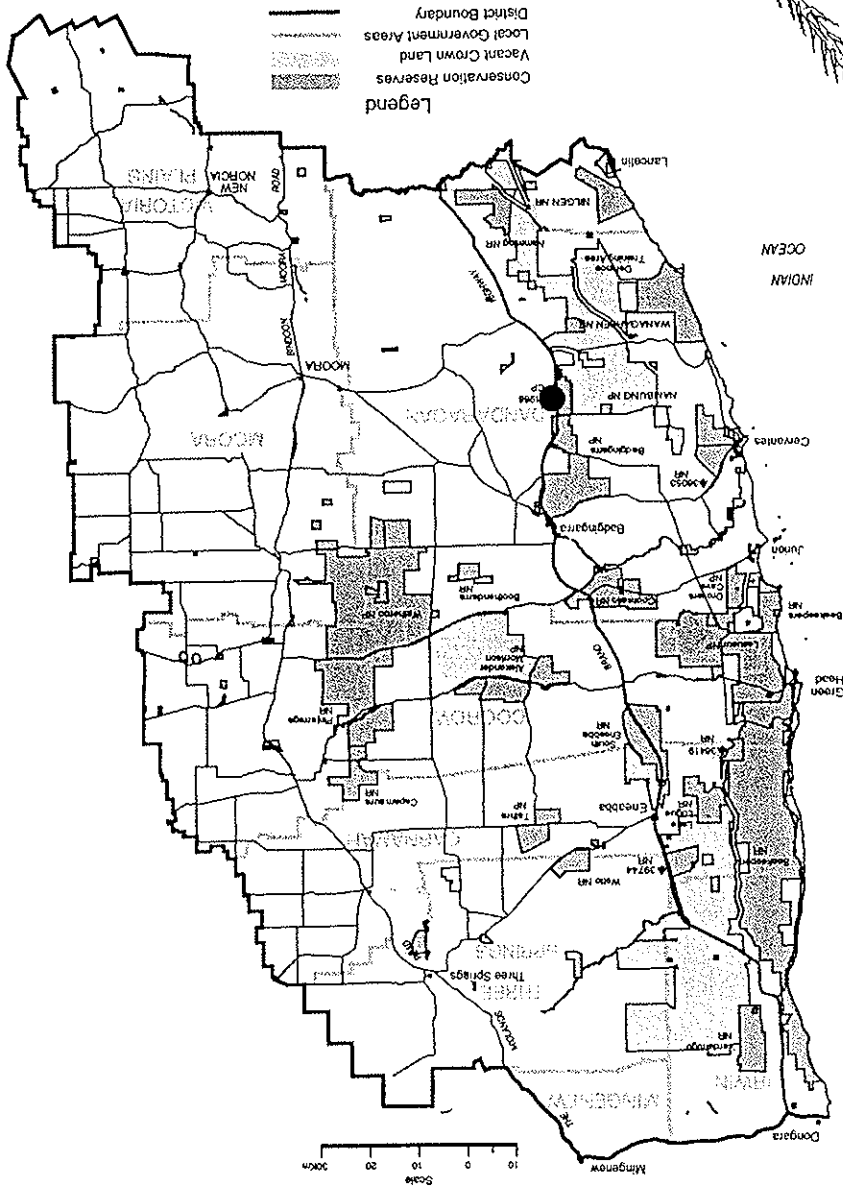
**Research Requirements**

- Further survey is required, particularly to refine and survey the known population and to establish the range northwards from the type locality.

**References**

- Lowrie (1987), Marchant and Lowrie (1993).
- Illustrations by A. Lowrie.

● *Drosera marchantii* subsp. *prophylla*



PROTEACEAE

*Dryandra borealis* A.S.George subsp. *elatior* A.S.George

[*Dryandra* sp. 20 (A.S.George 16787) [aff. *armata*]]

This subspecies was first collected in 1983, and was referred to by Griffin (1985) as *Dryandra* sp. H (Voucher A.S.George).

A bushy, erect shrub to 2.5 m in height, without a lignotuber. The stems are closely pubescent. The leaves are 4-9 cm long 12-30 mm wide, with deeply pinnatifid with 5-12 pungent pointed lobes on each side. The outer involucral bracts surrounding the inflorescences are mainly glabrous, the inner ones are lime-green in colour when fresh and have black hairs fringing and as central patches. There are 30-50 flowers per head. They are yellow in colour and the perianth limb is 7-7.5 mm long. The pistil is straight or somewhat bowed, 39-47 mm long. The follicles are hairy.

Differs from subsp. *borealis* in its larger, non-lignotuberous habit, with fewer leaf lobes, fewer flowers in each head and less hairy pistil.

Flowering Period: July-October

Distribution and Habitat in the Moora District

Known from a few populations over a range of ca. 25 km and occurring to the west of Three Springs.

Occurs on laterite, lateritic gravel and loam, on slopes often high in the landscape, amongst open low mallee woodland, scrub and low heath to 0.5 m, with *Melaleuca cardiophylla*, *Allocasuarina campestris* and species of *Hakea*, *Acacia*, *Astroloma*, *Dryandra* and *Eremaea*.

Conservation Status

Current: Priority I

Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Nebru Road	TS	Private	2.10.1990	10 est.	Disturbed
2. E of Arriwo	TS	MRWA Gravel Reserve	24.9.1990	200 est.	Partly disturbed
3. Dookanooka	TS	Nature Reserve	22.10.1992	50+	Good
4. SW of Three Springs	TS	MRWA Road Reserve, Private	10.7.1991	70+	Area grazed
1 * N of Three Springs	TS	-	14.10.1984	-	-
2 * SE of Arriwo	TS	MRWA Road Reserve	19.9.1991	Occasional-WH	-
1. NW of Three Springs	TS	MRWA Road Reserve	18.8.1993	10+	Undisturbed
2. NW of Three Springs	TS	Shire Road Reserve	18.8.1993	1	Undisturbed
3. NE of Arriwo	TS	Shire Road Reserve	18.8.1993	10+	Undisturbed
4. Kadathinni	TS	Nature Reserve	26.7.1994	30+	Good

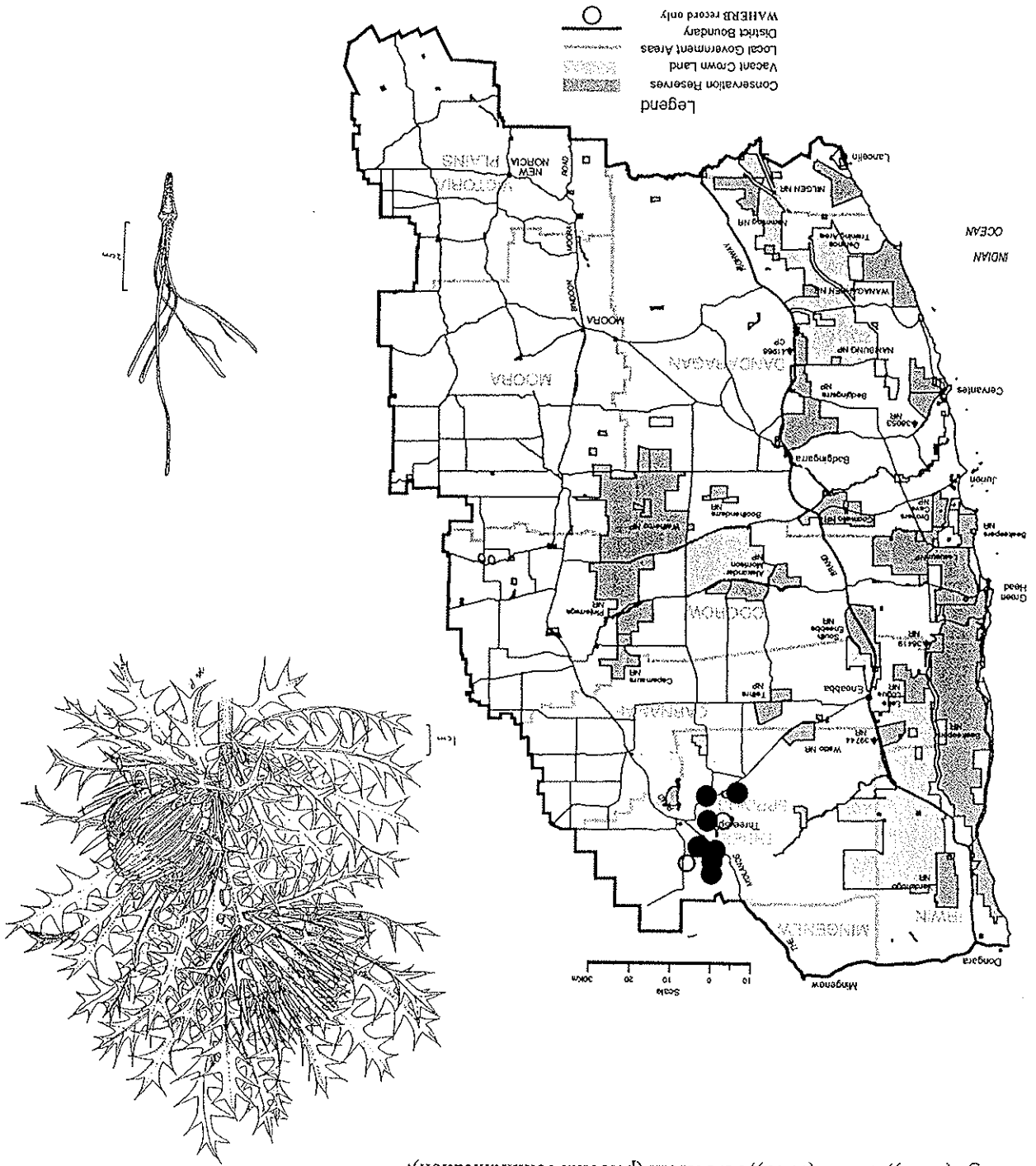
Response to Disturbance

Unknown

Susceptibility to *Phytophthora Dieback*

Presumed susceptible

● *Dryandra borealis* subsp. *elatior*



George (1996), Griffin (1985), M. Pieroni (personal communication).

References

– Further survey, particularly to survey populations 5 and 6.

Research Requirements

- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that markers are in place at all road verge populations.
- Maintain liaison with landowners and managers.

Management Requirements

PROTEACEAE

*Dryandra fraseri* R.Br. var. *oxycedra* A.S.George

[*Dryandra* sp. 23 (A.S.George 16788) [aff. *fraseri*]]

An erect shrub to 6 m tall, without a lignotuber and with erect or spreading columnar branches. The leaves are pinnately divided to the midrib, the segments fine and pungent. The inflorescence is terminal, with a convex receptacle and the involucral bracts shorter than the flowers. The flowers are yellow-brown in colour, the perianth claws are glabrous or sparsely hairy. The pistil is incurved and is longer than the perianth. This variety differs from the other varieties of *Dryandra fraseri* in its size, being a much taller plant, one of the tallest *Dryandra* species. It also differs in its non-lignotuberous habit, and has fewer, longer leaf-lobes and slightly larger flowers.

Flowering Period: August-early December

Distribution and Habitat in the Moora District

Occurs over a range of ca. 20 km to the west of Three Springs.

Grows on lateritic hills in gravel, brown loam or lateritic sand and has been recorded from open woodland of wandoo and jam, or powderbark wandoo *Eucalyptus accedens*, with low heath and heath. Associated species include other species of *Dryandra*, with *Acacia*, *Allocasuarina* and *Baeckea* species.

Conservation Status

Current: Priority 1

Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Kadathinni	TS	Nature Reserve	2.10.1990	700 est.	Partly disturbed
2. SW of Three Springs	TS	MRWA Road Reserve	24.9.1992	5+	Disturbed
3. Thomas Road	TS	Shire Road Reserve	26.9.1990	1	Undisturbed
4. Strutton Road	TS	Shire Road Reserve	26.9.1990	1	Disturbed and weed infested
5. Nebru Road	TS	Shire Road Reserve, Private	2.10.1990	30 est.	Some disturbance
6. SE of Arrimo	TS	Rail Reserve, Shire Road Reserve	18.8.1993	30+	Undisturbed
7. SSE of Arrimo	TS	MRWA Gravel Reserve	26.7.1994	1000+	Some disturbance
1 * N of Arrimo	-	-	9.1962	-	-
2 * 211.6 mile peg N of Three Springs	TS	-	8.1972	Rare-WH	-

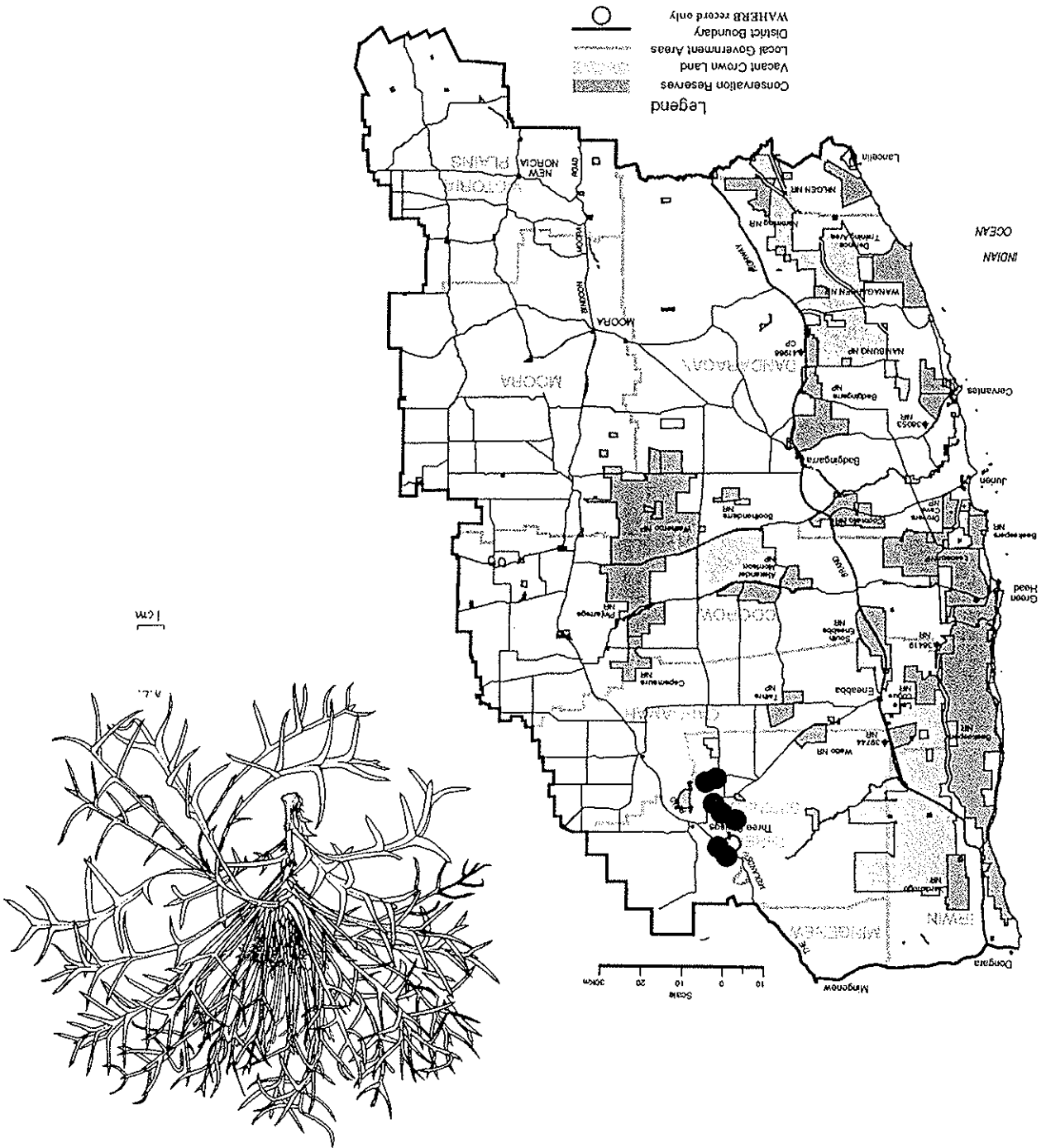
Response to Disturbance

Unknown

Susceptibility to *Phytophthora* Dieback

Presumed susceptible

● *Dryandra fraseri* var. *oxycedra*



George (1996), M. Pieroni (personal communication).

References

— Further survey is required.

Research Requirements

- Ensure that markers are present at all road verge populations.
- Ensure that dieback hygiene procedures are carried out at all populations.

Management Requirements

**Dryandra kippistiana** A.S.George var. **paenepeccata** A.S.George  
 PROTEACEAE [Dryandra sp. 46 (A.S.George 16866) [aff. *sclerophylla*]]

A lignotuberous, multistemmed, erect shrub to 1.2 cm tall, with linear, pinnatifid leaves which have 10-20 lobes. They are white-tomentose below. The flowers are pale yellow, grouped 50-80 per head. The inner involucral bracts are up to 10 mm long, shorter than the flowers. The perianth has fine spreading hairs and is 18-20 mm long. The pistil is 24-25 mm long. The follicles remain closed until burnt.

This variety differs from var. *kippistiana* in the later flowering time (August to October in var. *kippistiana*) and in the leaves, which are straighter, more erect and coarsely lobed than those of var. *kippistiana*. Both varieties are vegetatively similar to *Dryandra sclerophylla*, but are distinguished by the pistil, which is more slender and is looped before anthesis and has a thicker pollen presenter. There has been considerable confusion in the past between these taxa.

Flowering Period: October-November

**Distribution and Habitat in the Moora District**

Occurs at scattered localities within the range of the species, from Eneabba and Mt Lesueur to the southern boundary of the District.

Also occurs further south in the Gingin and Armadale areas in the Swan Region.

Grows on lateritic uplands, in low open heath in grey brown sandy gravel or grey sand over laterite. Associated species include *Calothamnus sanguineus*, *Hibbertia hypericoides* and *Lambertia multiflora*.

**Conservation Status**

Current: Priority 1

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Willis Road	Co	-	31.10.1986	-	-
2. SW of Carnamah	Ca	Shire Road Reserve	4.10.1990	2	Disturbed
1. Mt Peron	D	National Park	25.10.1979	-	-
2. W of Gillingarra	D	-	1.10.1988	-	-
3. W of Mt Peron	-	-	15.11.1971	-	-
4. N of Regans Ford	D	-	14.11.1964	-	-
5. * Near Eneabba	-	-	9.1963	-	-

**Response to Disturbance**

Population 2 occurred in an area burnt three years previously. The plants were 25 cm tall.

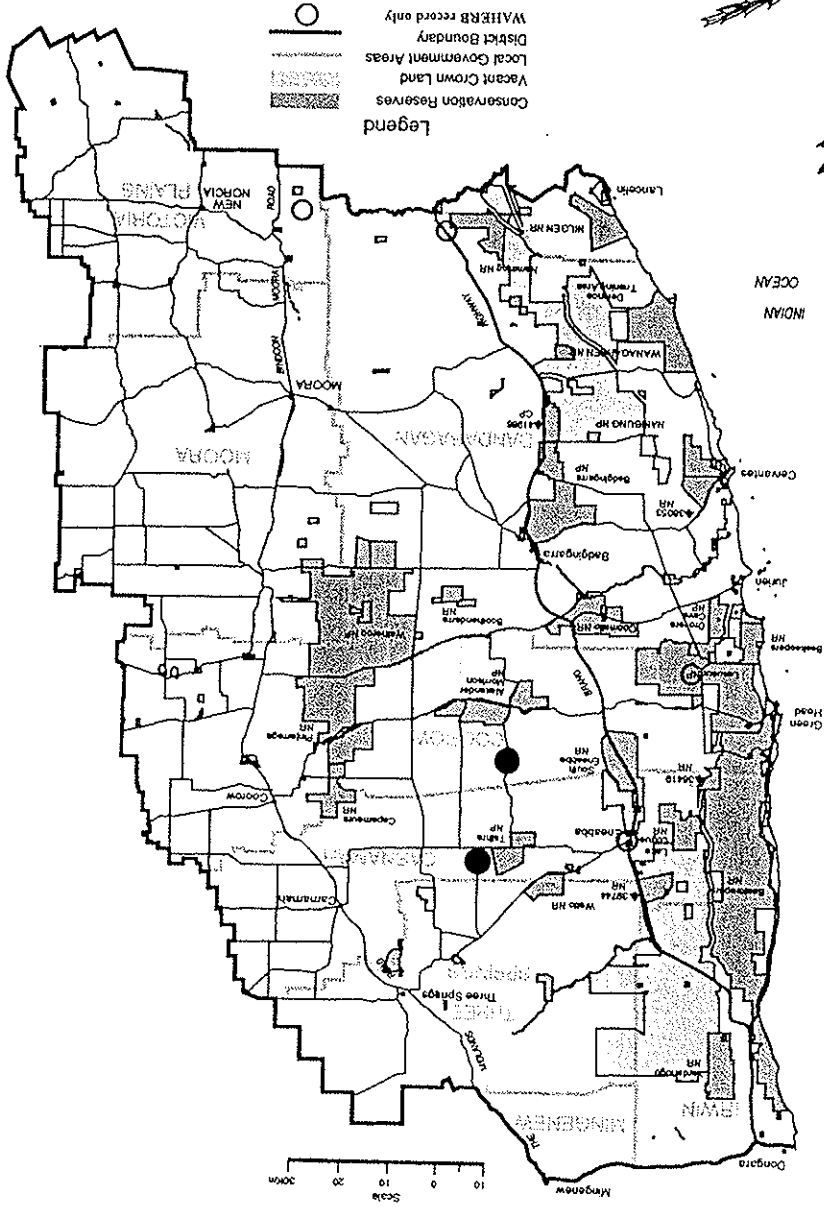
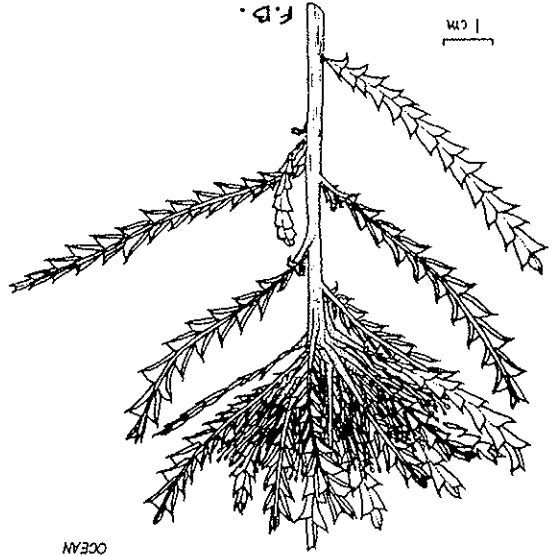
**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

-- Ensure that dieback hygiene procedures are carried out at all populations.

● *Dryandra kippistiana* var. *paenepeccata*



References  
George (1996).

— Further survey is required to refine and survey all past recorded populations and to establish the full extent of the variety throughout the range. Taxonomic confusion in the past has been clarified by recent work by A.S. George and it should now be possible to assess accurately the conservation status of the taxon.

Research Requirements



This species was originally included on the Priority Flora List as *Dryandra* sp. 15 (E.A. Griffin 3453) [aff. *hewardiana*] and was listed as *Dryandra* aff. *patens* (E.A. Griffin 1507) in Burbidge and van Leeuwen (1990). It was referred to as *Dryandra* sp. 1 (Voucher E.A. Griffin 2404) in Griffin (1985). (The account on P.30 should read "related to *D. patens*", not "*D. armata*".

A shrub to 3 m tall, without a lignotuber. It is single-stemmed at base, usually much-branched and spreading or erect and columnar. The branches are densely leaved, leaves rigid, dark green in colour and white-tomentose beneath. They are 5-20 cm long, 4-9 wide with 8-18 triangular teeth on each side. The flower heads are in the upper leaf axils, surrounded by a few floral leaves. The flowers are pale yellow or cream, 23-25 mm long, with a straight pistil to 31 mm long. The follicles have prominent veins.

Flowering Period: August-October

**Distribution and Habitat in the Moora District**

Endemic to the Moora District, occurring between the Eneabba and Badgingarra areas.

A large population has also been recorded in the eastern section of Lesueur National Park (Burbidge and van Leeuwen 1990).

Grows on lateritic rises amongst massive laterite in grey sand or clay and gravel in scrub or dense to low open heath. Sometimes occurs in open mallee woodland with *Eucalyptus drummondii* or in sandy loam over sandstone in open heath. Also occurs in lower damp areas, near a creek and in wandoo woodland.

**Conservation Status**

Current: Priority 1

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Coomalloo	D	Nature Reserve, MRWA Road Reserve	21.10.1992	30+	Undisturbed
2. S of Eneabba	Ca	Nature Reserve	6.11.1992	20 est.	Undisturbed
3. Boothendarra	D	Nature Reserve	29.4.1992	5+	Undisturbed
4. Watheroo West Road	D	Shire Road Reserve	20.10.1992	20+	Undisturbed
5. Coorow-Greenhead Road	Co	MRWA Road Reserve	21.10.1992	20+	Good
6. Neeroo Spring	TS	Unvested Reserve	22.10.1992	30+	Undisturbed
7. Cantabilling Road	D	Shire Gravel Reserve	1.5.1991	200 est.	Close to gravel pit
8. Marchagee Track	Co	Shire Road Reserve	21.8.1991	40 est.	Undisturbed
9. Marchagee Track	D/Co	Shire Road Reserve	14.8.1991	100+	Undisturbed
10. S of Tathra	Co	Shire Road & Gravel Reserves	5.11.1992	200+	Undisturbed
11. Willis Road		Shire Road Reserve, Private	27.7.1994	100+	Undisturbed
12. W of Eneabba	Ca		26.2.1981	-	Disturbed
13. N of Badgingarra	D		7.8.1986	-	-
14. *Near Carnamah	Ca		11.8.1961	-	-

### Populations Known in the Moora District (Cont'd)

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
15.*Alexander Morrison	Co	National Park	7.9.1979	-	-
16.*Cadda Road	D	-	1.8.1983	-	-

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

#### Management Requirements

- Ensure that dieback hygiene procedures are carried out at all populations.

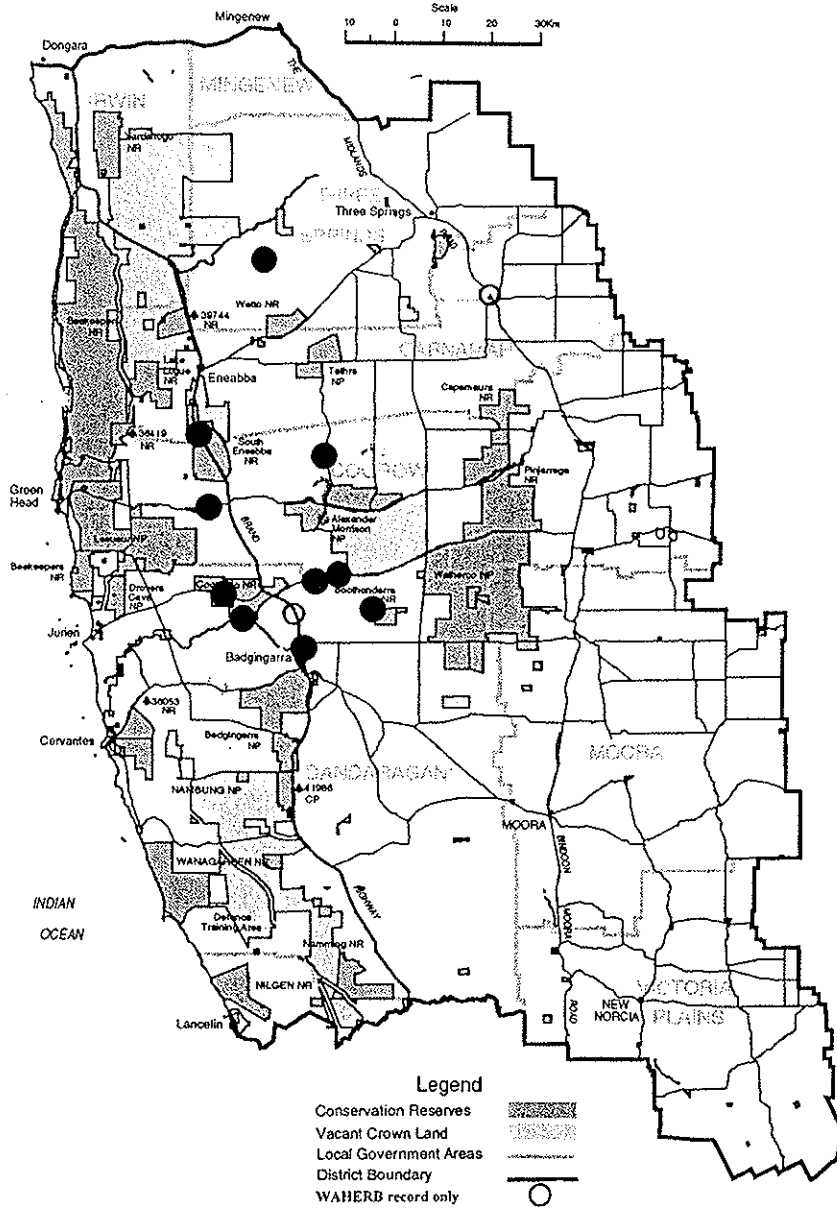
#### Research Requirements

- Further survey is required in the Lesueur area.

#### References

Burbidge and van Leeuwen (1990), George (1996), Griffin (1985).





● *Dryandra stricta*

## *Dryandra trifontinalis* A.S.George

PROTEACEAE

[*Dryandra* sp. 42 (A.S.George 16789) [aff. *hewardiana*]]

A tall erect shrub to 2 m, with pale green leaves, tomentose beneath, 3-16 cm long, 10-18 mm wide, with 5-10 triangular teeth on either side. The involucral bracts are glabrous, or with short cilia on the margins. They are to 10 mm long. The flowers are pale yellow, the perianth ca. 25 cm long, the perianth limb is glabrous, 3-4 mm long. The pistil is straight, to 26 mm long, with the pollen presenter 1.8-2 mm long.

Similar to *Dryandra hewardiana*, which has a more hairy involucral bracts, a smaller perianth limb and smaller pollen presenter.

**Flowering Period:** August-September

### **Distribution and Habitat in the Moora District**

Known from only three or four populations to the west and south-west of Three Springs.

Grows on lateritic hills in open low woodland of *Eucalyptus wandoo* with heath and open dwarf scrub. Associated species include other species of *Dryandra* and *Commersonia pulchella*.

### **Conservation Status**

Current: Priority 1

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Nebru Road	TS	Nature Reserve, Private	2.10.1990	1000 est.	Disturbed
2. Lynch Road	TS	Gravel pit, Shire	26.7.1994	1000+	-
3. Nebru Road	TS	Private	2.10.1990	7 est.	-
1.* Nebru Road	TS	-	6.10.1986	-	-

### **Response to Disturbance**

Unknown

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

Presumed susceptible

### **Management Requirements**

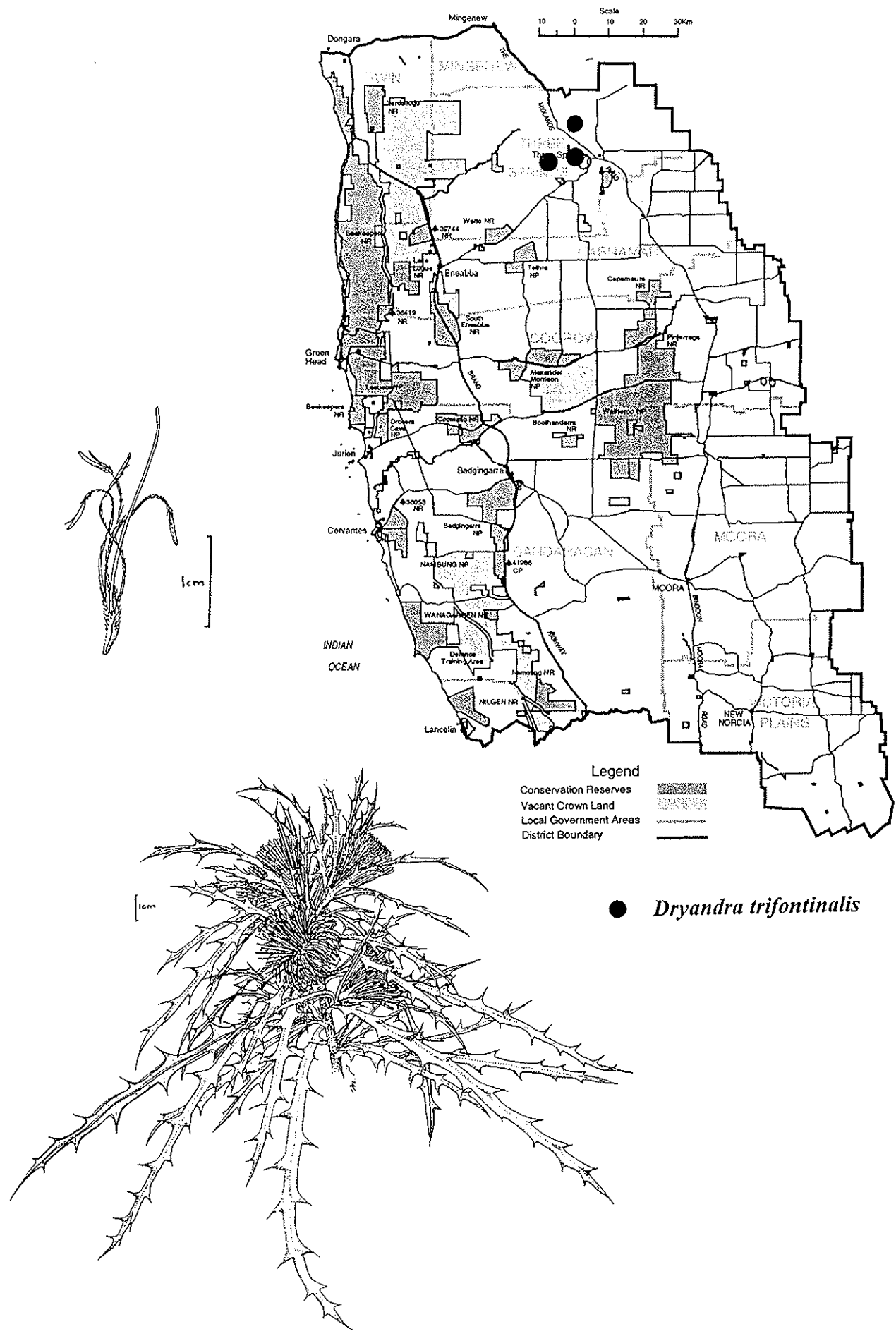
- Ensure that dieback hygiene procedures are carried out at all populations.

### **Research Requirements**

- Further survey is required.

### **References**

George (1996).



*Eucalyptus absita* P.M.Grayling & Brooker x *loxophleba* Benth.

MYRTACEAE

An erect, open mallee to 10 m high. The bark on the stems is fibrous, box-like and pale grey for 4 m from the base, then smooth and greenish-grey in colour above. The stems have oil glands in the pith only at the nodes. There are many oil glands in the leaves.

**Flowering Period:** Unknown

**Distribution and Habitat in the Moora District**

Known from three small populations south-east of Badgingarra where it occurs with both parents.

Occurs on white lateritic sand in open shrubland over open heath and with *Eucalyptus rudis*, *E. loxophleba*, *E. absita* and *E. wandoo*.

**Conservation Status**

Current: Priority 1

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SE of Badgingarra	D	Shire Road Reserve	3.7.1992	1	Disturbed
2. SE of Badgingarra	D	Private	11.4.1991	5	-
3. Koonah Road	D	Private, Shire Road Reserve	11.4.1991	2	Growing in open shrubland in paddock

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed not susceptible

**Management Requirements**

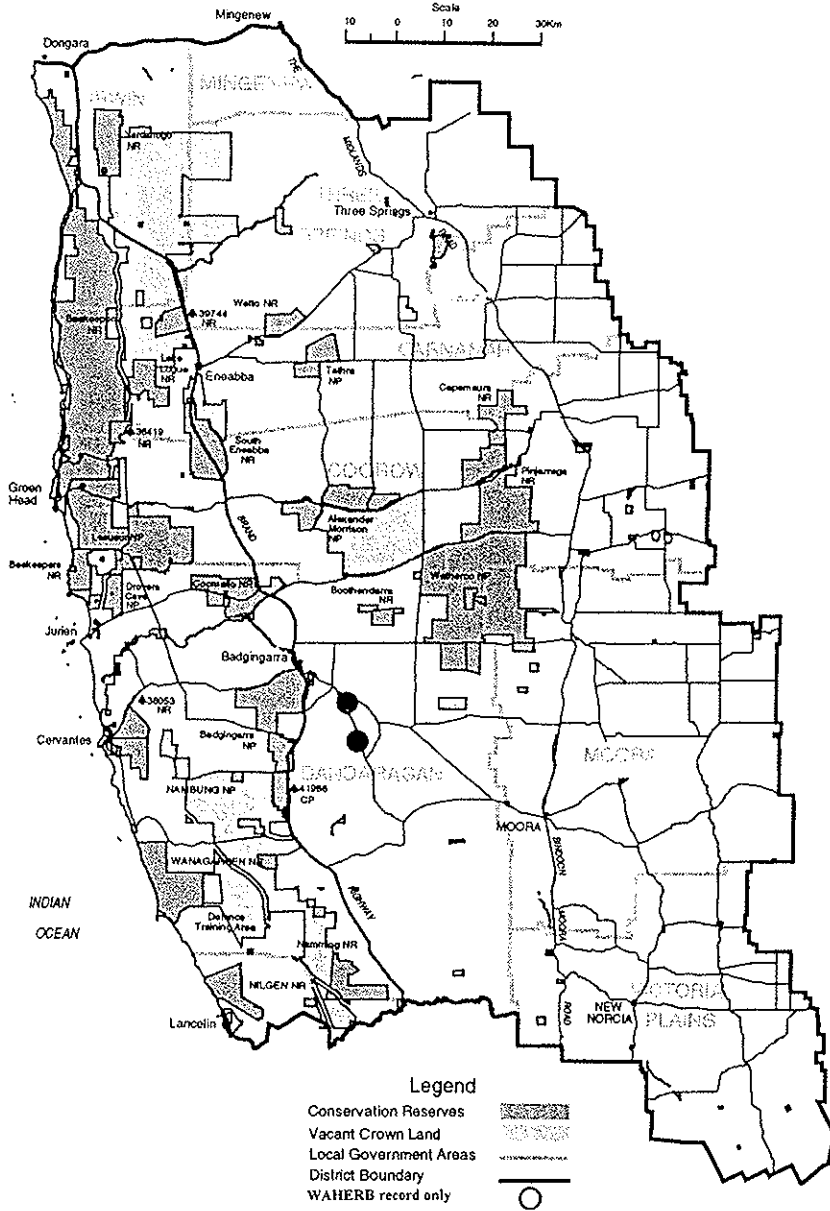
- Maintain liaison with landowner and Shire.
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

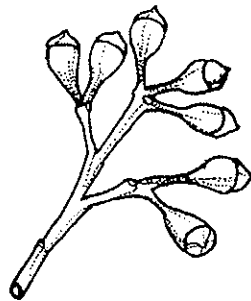
- Further survey for this hybrid and *E. absita* is required.
- Investigation of seed set and seed viability.

**References**

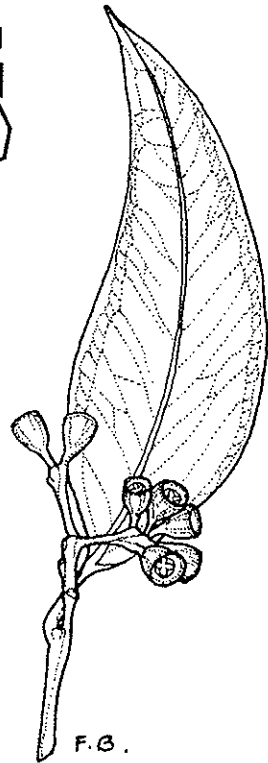
Grayling and Brooker (1992).



*Eucalyptus absita x loxophleba*



1 cm



F.B.

## *Eucalyptus annuliformis* P.M.Grayling & Brooker

MYRTACEAE

A mallee to 3 m tall, with smooth grey bark. The leaves are elliptic to broadly lanceolate, alternate and dull green in colour. There are 7 flowers in the inflorescence. The buds have pedicels to 1.7 cm long and each bud has two bud caps, the inner is shed early, the outer is conical and slightly beaked. The fruits are hemispherical, 1.1 x 1.4 cm with a thick rim and broad disc.

*Eucalyptus annuliformis* is possibly of hybrid origin with *E. drummondii* as a parent. It flowers profusely, produces abundant fruit but no viable seed has yet been collected. The pollen fertility is low.

It differs from *E. drummondii* in the grey bark, rather than white, in the larger, non-glaucous buds (to 2 x 1.3 cm), the beaked bud caps, and the disc of the fruit which is flat, not domed, and forms a ring, becoming sunken.

**Flowering Period:** May-September

### **Distribution and Habitat in the Moora District**

Known from one small population south-east of Dandaragan.

Grows in shallow, white sandy soil on a lateritic breakaway in open low woodland of *E. calophylla* over low heath with *Hibbertia hypericoides*, *Dryandra* sp., *Hakea trifurcata*, *Acacia pulchella*, *Melaleuca radula* and *Hakea* sp.

### **Conservation Status**

Current: Priority 1

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SE of Dandaragan	D	Private	9.7.1987	2	Undisturbed

### **Response to Disturbance**

Unknown

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

Presumed not susceptible

### **Management Requirements**

- Maintain liaison with the landowner.
- Ensure that dieback hygiene procedures are carried out at population.

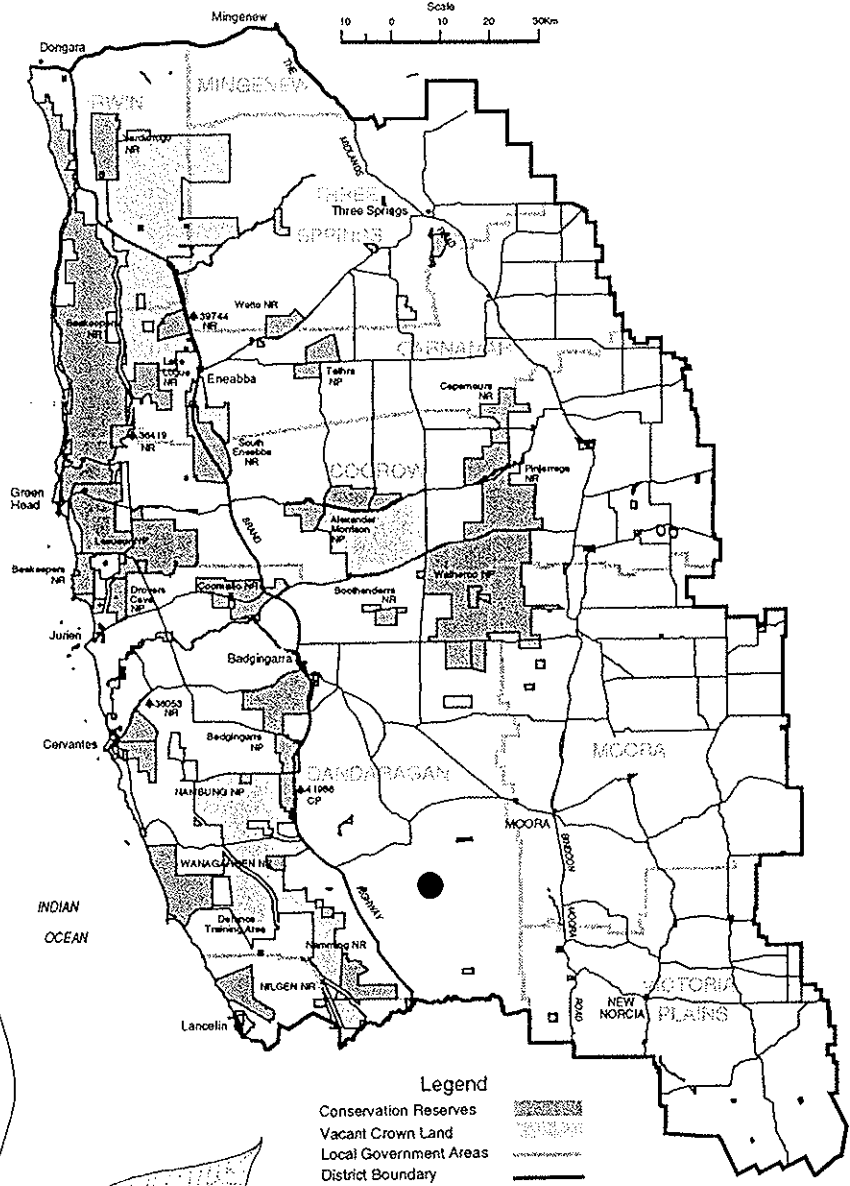
### **Research Requirements**

- Further survey is required.
- Further investigation of seed set and seed viability.

### **References**

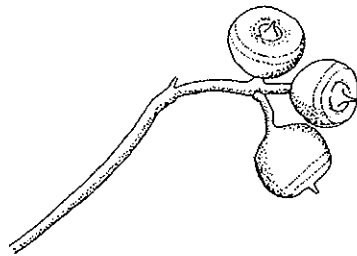
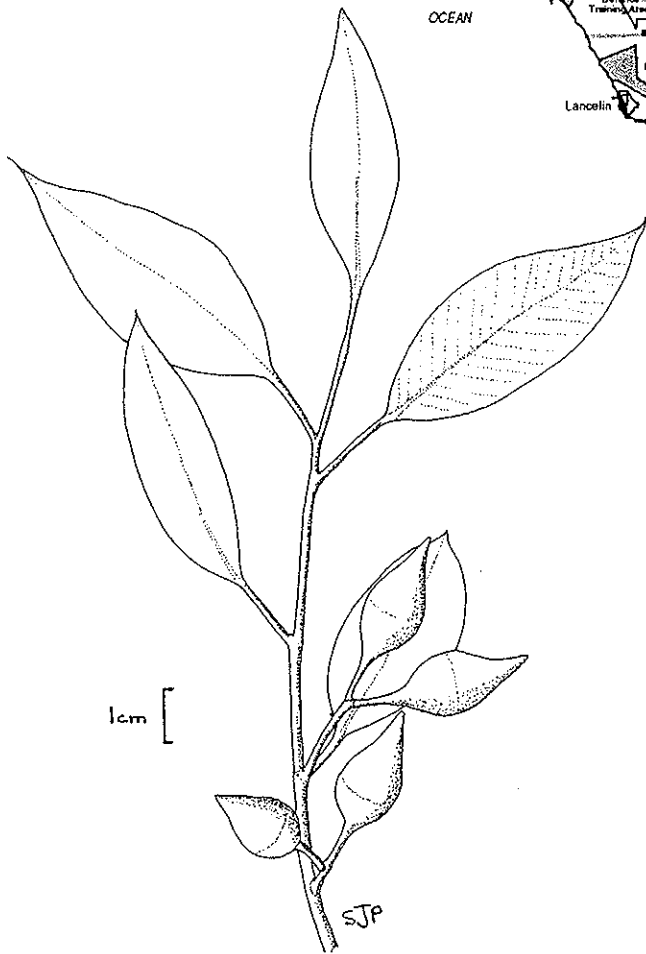
Grayling and Brooker (1992).





Legend  
 Conservation Reserves  
 Vacant Crown Land  
 Local Government Areas  
 District Boundary

● *Eucalyptus annuliformis*



*Eucalyptus macrocarpa* Hook. x *pyriformis* Turcz.

MYRTACEAE

A mallee 1.2-3 m x 5-15 m. The stems sometimes have a brown, flaking stocking and are smooth and cream to grey above or may have patches of brown, flaking bark. The leaves are petiolate, ovate-lanceolate in shape, and are opposite to alternate and glaucous. The buds are large, ovoid, to 4 x 4.5 cm in diameter, the bud cap with a short beak. The flowers are red, pink or yellow. The fruits have peduncles to 1.5 cm long and are often ridged and have a moderately protruding disc. They are up to 5 cm in diameter.

The most northerly population, which occurs in the Geraldton District, is a hybrid between *Eucalyptus macrocarpa* subsp. *elachantha* and *E. pyriformis* and is a low mallee to 1.5 m with small, narrow leaves.

**Flowering Period:** April and August-December

**Distribution and Habitat in the Moora District**

Occurs mainly within the Moora District along the eastern side south to the Calingiri area. The most northerly population occurs west of Mingenew in the Geraldton District and the most southerly population occurs south-east of Bolgart in the Merredin District. There is also a record from Cunderdin 70 km south-east of Bolgart.

Grows on yellow or grey sand or sandy loam, sometimes over gravel or associated with laterite, in low heath, sometimes in tall scrub with *Actinostrobos* sp. or in open mallee woodland. It occurs on slopes, ridges and hilltops and often grows in association with *E. macrocarpa*.

**Conservation Status**

Current: Priority 1

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Bolgart	VP	?Shire Road Reserve, Private	13.5.1991	4	Heavy weed infestation and possible herbicide damage on Road Reserve, plants in grazed paddock
2. S of Gabalong	VP	Rail Reserve	13.5.1991	1	Undisturbed
3. Konnongoring Road	VP	Shire Road Reserve	13.5.1991	1	Weed infestation and sand drift on verge, plants damaged by insect attack
4. N of Piawaning	VP	Shire Reserve	13.5.1991	1 large clump	Undisturbed
5. S of Gabalong	VP	Rail Reserve	13.5.1991	1	Plant at edge of track, damaged
6. S of Mount Adams	I	VCL	19.8.1993	2	Undisturbed
1.* SSW of Three Springs	TS	-	31.7.1980	1	-
2.* NNE of Watheroo	Mo	-	29.7.1980	-	-

**Response to Disturbance**

Unknown

## Susceptibility to *Phytophthora Dieback*

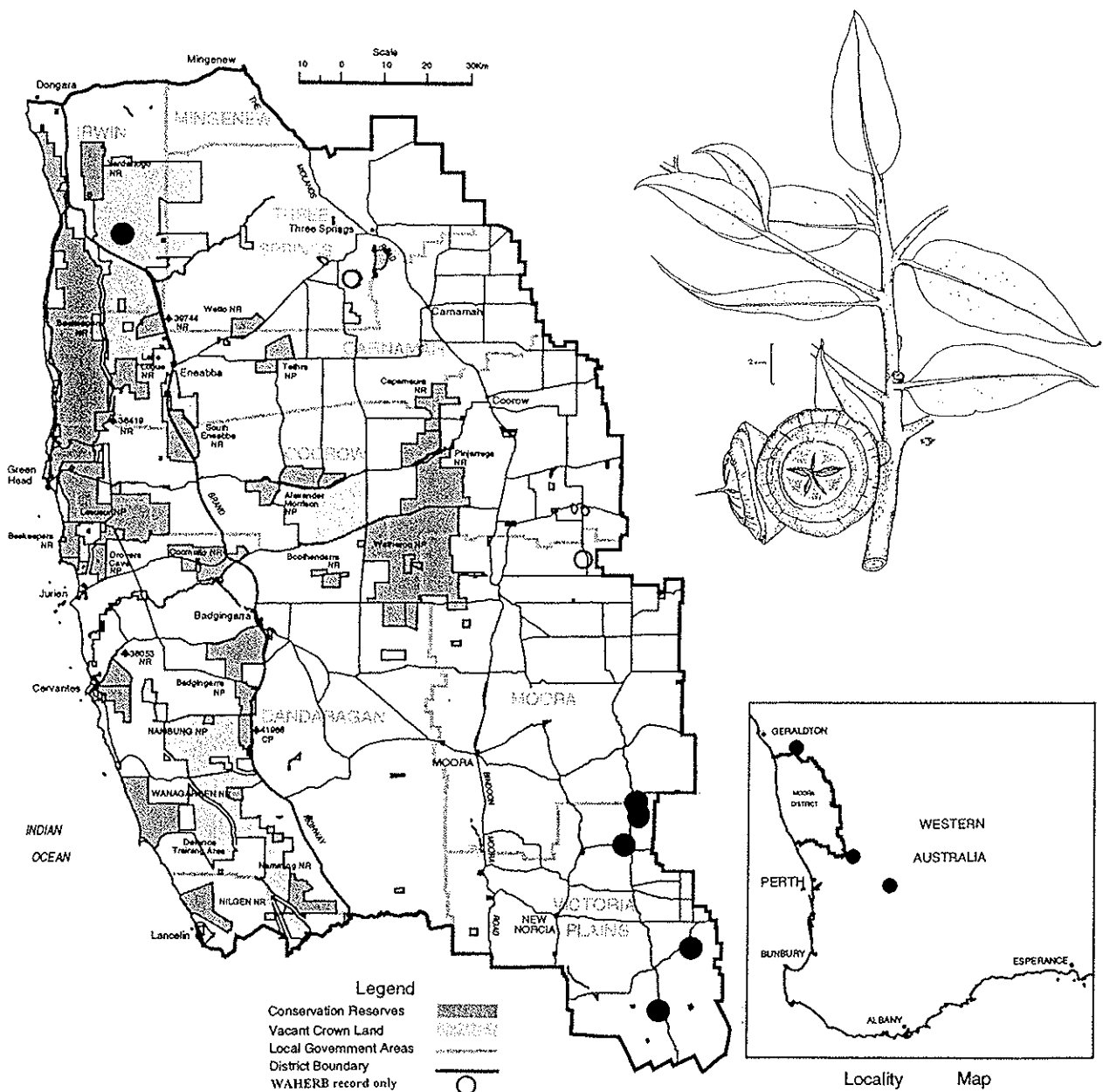
Presumed not susceptible

### Management Requirements

- Ensure that road verge populations are marked.
- Maintain liaison with land managers.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Conduct weed control where necessary.

### Research Requirements

- Further survey, particularly on remnant vegetation in the vicinity of population 3 and on conservation reserves within the range of the taxon.
- Investigation of seed set and seed viability.



● *Eucalyptus macrocarpa x pyriformis*

*Eucalyptus subangusta* (Blakely) Brooker & Hopper  
subsp. *virescens* Brooker & Hopper

MYRTACEAE

A mallee, 2-5 m tall with grey or pale copper, smooth bark. The pith of the branchlets is glandular. The juvenile leaves are dull, bluish-green to green, the adult leaves are glossy, lanceolate in shape, to 11 cm long and ca. 1 cm wide. There are groups of up to 17 white flowers in each inflorescence and the peduncle ca. 1 cm long. The buds are spindle-shaped, 1 cm x 0.3 cm. The operculum is the same width as the hypanthium at the join on mature buds. The fruit is cup-shaped with a short stalk 5 mm x 5 mm.

Differs from the typical subspecies in the adult foliage which is light green and slightly glossy in the older leaves within the crown. The foliage of all the other subspecies is dull and blue-green.

**Flowering Period:** Unknown

**Distribution and Habitat in the Moora District**

Known from only four populations occurring between Manmanning in the Merredin District and Watheroo in the Moora District and near Narambeen in the Narrogin District. Grows on a range of soil types, from yellow sand with *Eucalyptus flocktonii* and *E. sheathiana* to white clay with *E. yilgarnensis* and *E. erythronema*. Also occurs on clay loam with *E. salmonophloia*.

All four populations are on road verges in largely cleared agricultural land.

**Conservation Status**

Current: Priority 1

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* S of Piawaning	VP	?MRWA Road Reserve	26.8.1982	-	-
2.* NE of Moora	Mo	Shire Road Reserve	2.9.1984	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed not susceptible

**Management Requirements**

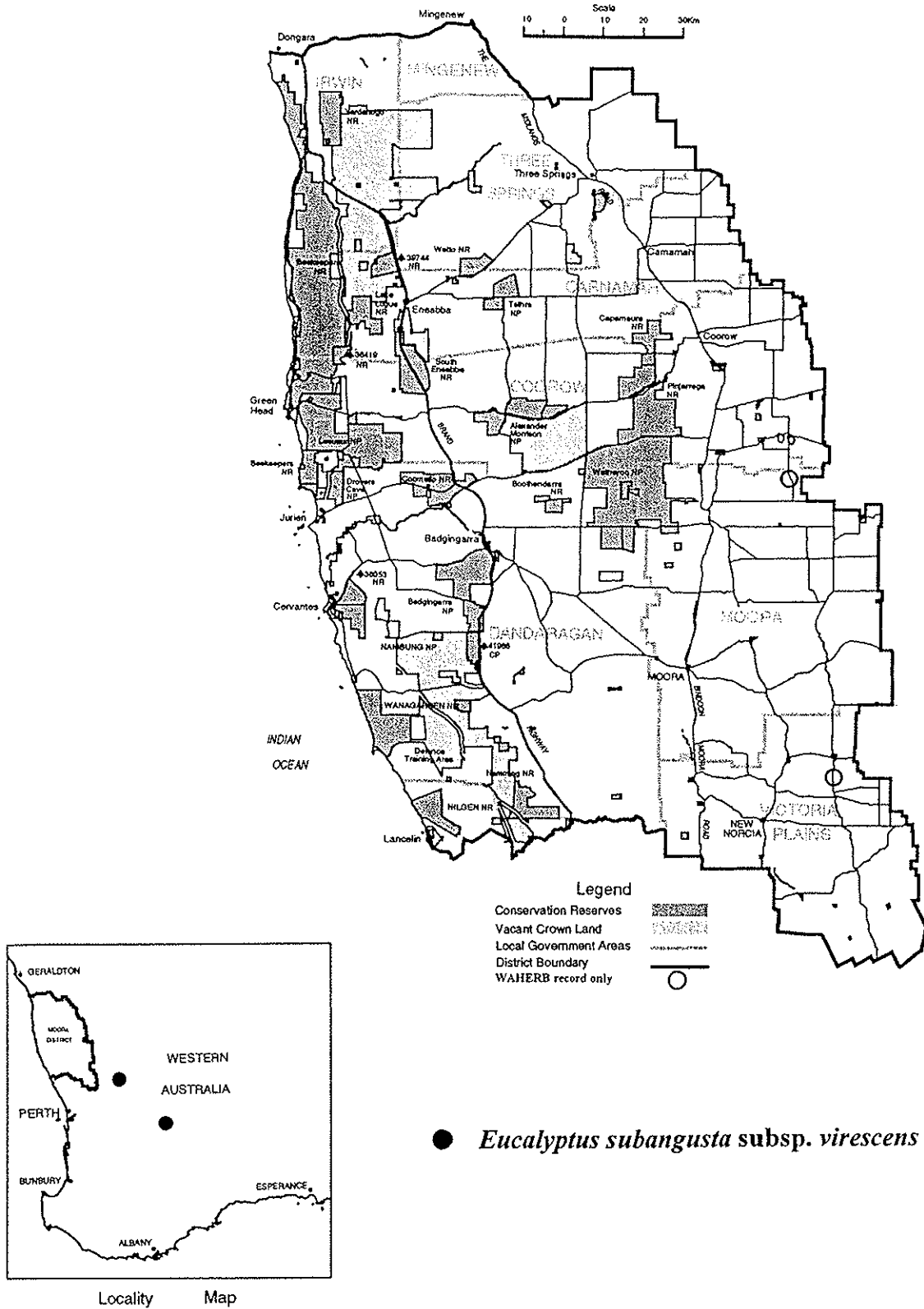
- Refind all populations previously recorded and ensure that markers are in place.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

**Research Requirements**

- Further survey is urgently required to refind all recorded populations and locate others particularly on conservation reserves. No searches were made during this survey in the Moora District.

References

Brooker and Hopper (1991).



## *Eucalyptus* sp. Lesueur (E.A.Griffin 2481)

MYRTACEAE

A low, spreading mallee to 1.5-3 (5) m tall. The bark is tessellated and rough at the base, smooth and creamy-white above. The leaves are short, slightly glossy and light green, with dense venation. The buds are 7-12 cm x 0.4-0.6 cm, with a hemispherical or slightly beaked budcap. The fruits are barrel or urn-shaped, with a narrow opening, to up to 3.8 cm x 2.6 cm.

Brooker and Kleinig (1990) included this taxon as a disjunct mallee form of *Eucalyptus haematoxylon* which occurs on the western side of the Darling Range from east of Byford south to east of Capel.

Differs from the southern form, which is a small tree, in its mallee habit and in the glossy leaves, which are dull in the southern form.

The taxonomic status of this taxon is at present uncertain but it is possibly an undescribed species and it is important to maintain its conservation status.

**Flowering Period:** March

### **Distribution and Habitat in the Moora District**

Known only from a few populations in the Lesueur area.

Occurs in gullies, slopes and below breakaways in low open heath with *E. marginata*, *E. calophylla*, *E. haematoxylon*, *E. drummondii* and *E. lateritica* in shallow sand over sandstone.

### **Conservation Status**

Current: Priority 1

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* Mt. Peron	D	National Park	2.3.1983	-	-
2.* NW of Mt Michaud	D	National Park	3.3.1983	-	-
3.* ENE of Mt Peron		National Park	2.3.1983	-	-
4.* NE of Mt Lesueur	D	National Park	24.5.1983	-	-
5.* E of Mt Michaud	D	National Park	21.9.1982	-	-
6. Cockleshell Gully	D	-	15.8.1991	-	-

### **Response to Disturbance**

Unknown

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

Presumed not susceptible

### **Management Requirements**

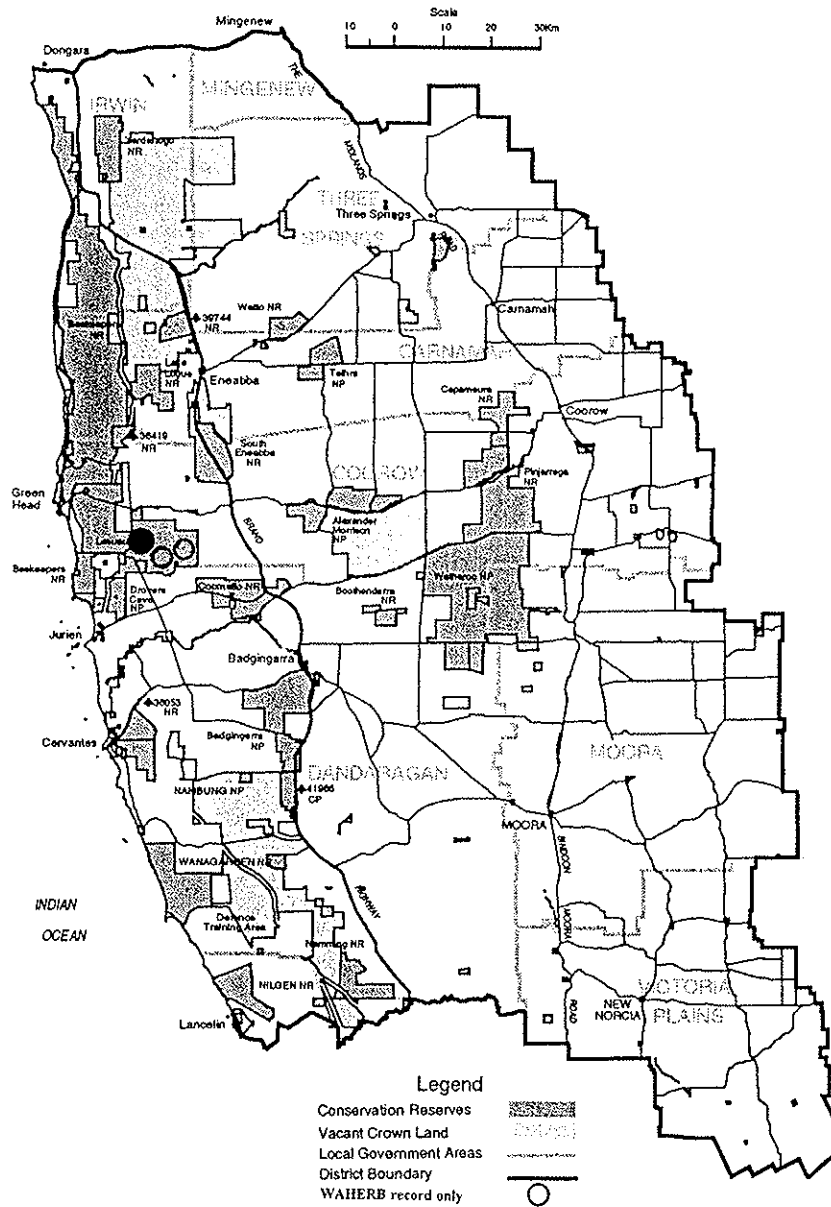
- Further survey.
- Ensure that dieback hygiene procedures are carried out at all populations.

### **Research Requirements**

- Further survey is required to refind populations 1-6.

## References

D. Blaxell (personal communication), Brooker and Kleinig (1990).



● *Eucalyptus* sp. Lesueur (E.A.Griffin 2481)

## *Gastrolobium rotundifolium* Meisn.

FABACEAE

Gilbernine Poison

A low, erect shrub to 0.6 m tall. The leaves are opposite, with a pair of persistent stipules united with the lower part of the leaf stalk. The leaves are usually broad, with undulate margins, oblong in shape, tapering to a pointed tip. A form from between Miling and Walebing has narrow leaves with the margins rolled under. The branches and young leaves are hairy but the leaves become hairless with age, dark green and hairless above and pale underneath. The flowers are orange-yellow with reddish-brown to purple markings. They are borne in dense racemes at the ends of the branches. The flower bracts are broad, chestnut brown in colour and conceal the buds until they open. The fruit is a short, broad and hairy pod.

**Flowering Period:** August-September

### **Distribution and Habitat in the Moora District**

Known from several populations on private land and a road reserve near Watheroo but has been collected in the past from a number of locations in the Moora District further to the south-east between Miling and Calingiri. It has also been recorded from north of the District at Mingenew in the Geraldton District and from much further south in the wheatbelt near Wagin in the Katanning District.

Grows in white sandy clay soils or gravelly loam on quartzite ridges and granite, or on flat, sandy clay soil in open low woodland of *Eucalyptus wandoo* and *E. loxophleba* with low, open scrub. Associated species include *Allocasuarina campestris* and *Melaleuca radula*. Prefers open areas (Gardner and Bennetts 1956) but also grows in woodland.

### **Conservation Status**

Current: Priority 1

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. North-east of Watheroo	Mo	Private	17.8.1993	5+	Healthy
2. North-east of Watheroo	Mo	Private	17.8.1993	1	Healthy
3. East of Watheroo	Mo	Private	17.8.1993	2	Dense weed infestation
4. East of Watheroo	Mo	Shire Road Reserve	17.8.1993	15+ (54 + 45 recorded in 1989)	Healthy
5.* Bindi Bindi	Mo	-	9.1930	-	-
6.* Yerecoin	VP	-	13.8.1946	-	-
7.* Miling	Mo	-	7.9.1959	-	-
8.* Calingiri	VP	-	30.8.1948	-	-
9.* East of Carani	VP	-	16.9.1964	-	-

### **Response to Disturbance**

The plant is known to sucker if cut off at ground level, so may resprout after fire. It contains monofluoroacetate and is toxic to stock.

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

Presumed susceptible



### Management Requirements

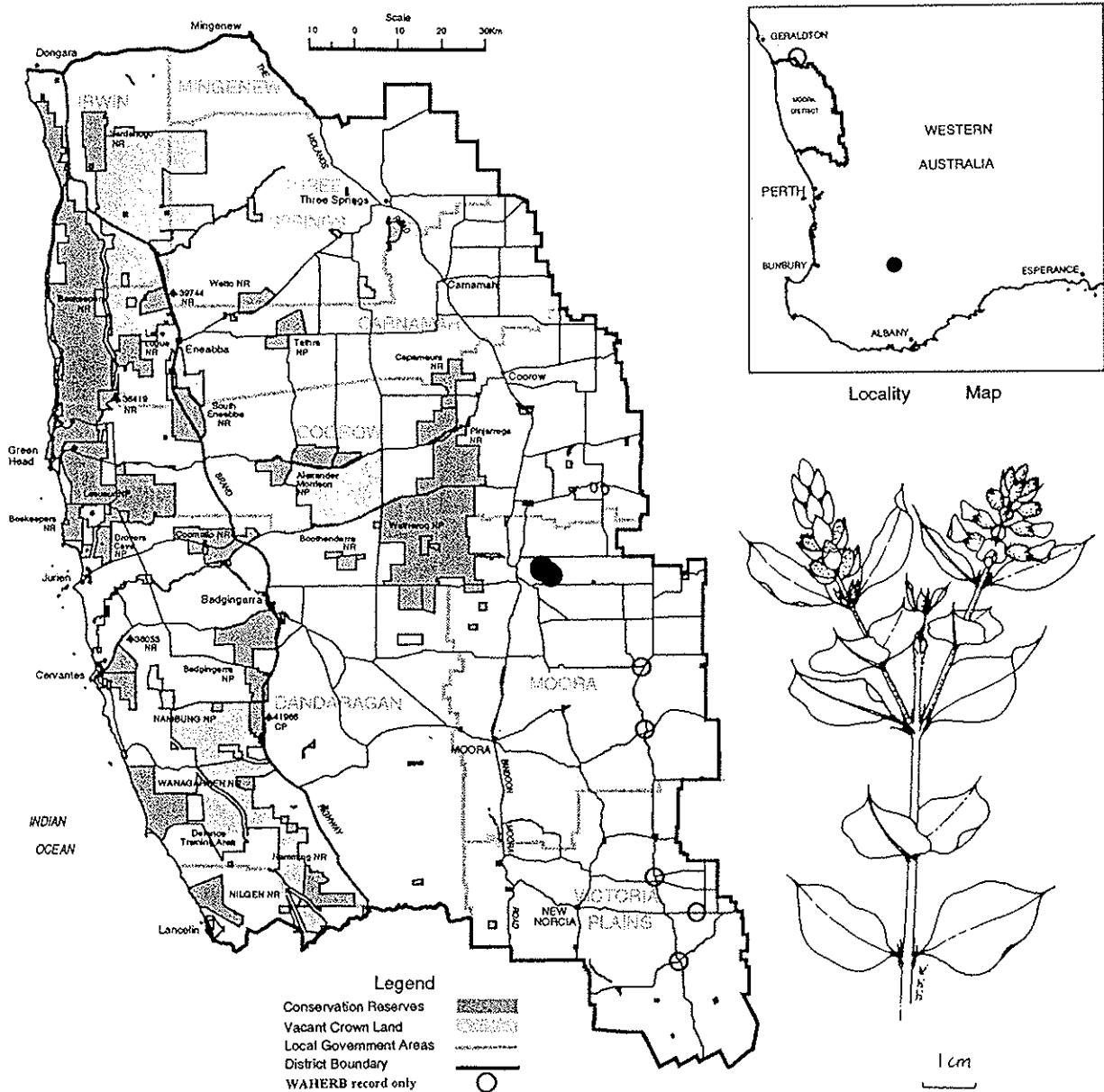
- Ensure that dieback hygiene procedures are carried out at all populations.
- Maintain liaison with land owners and managers.
- Conduct weed control where necessary.

### Research Requirements

- Further survey is required.

### References

Aplin (1969, 1973), Bentham (1864), Everist (1981), Gardner and Bennetts (1956), Leigh *et al.* (1984), Sampson and Hopper (1990).



● *Gastrolobium rotundifolium*

## *Gompholobium* sp. Gairdner Range (E.A.Griffin 2306)

FABACEAE

A low, erect shrub to 0.5 m tall with several erect stems arising from the base. The leaves have short stalks to 5 mm long. They are divided into up to seven leaflets arising from the same point. Each leaflet is folded and 10 to 20 mm long, ca. 3 mm wide with a pointed tip below which the leaf is often shortly dilated to ca. 8 mm wide. The flowers usually occur singly or with up to three on each peduncle which is ca. 1 cm long, the pedicel is ca. 1.5 mm long. Each flower has a calyx divided into five oblong hairless lobes. The corolla is yellow and ca. 1.5 mm in diameter. The fruit is an ellipsoid pod ca. 10 mm long and 9 mm wide. This taxon appears to be related to *Gompholobium polymorphum*.

**Flowering Period:** September-November

### **Distribution and Habitat in the Moora District**

Endemic to the Moora District, occurring mainly in the Lesueur area but extending about 35 km to west of Badgingarra. It has been found in ca. 50 places in the Lesueur National Park with only a few plants at each site (E. Griffin, personal communication).

Grows in white, grey or brown sandy or sandy clay soil with lateritic and sandstone gravel on the slopes of hills or below breakaways. Associated vegetation is of open low heath, associated species including *Allocasuarina humilis* and *Dryandra* species.

### **Conservation Status**

Current: Priority 1

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Mt Lesueur	D	National Park	6.10.1991	100+	Good
2. Badgingarra	D	National Park	20.10.1992	50+	Good
3.*ENE of Mt Lesueur	D	National Park	6.11.1979	-	-
4.*Mt Lesueur	D	National Park	22.9.1979	-	-
5.*N of Mt Lesueur	D	National Park	22.11.1979	-	-

### **Response to Disturbance**

One population was growing both in undisturbed heath and on a firebreak, the other in an area of regenerating heathland that had been burnt a few years previously.

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

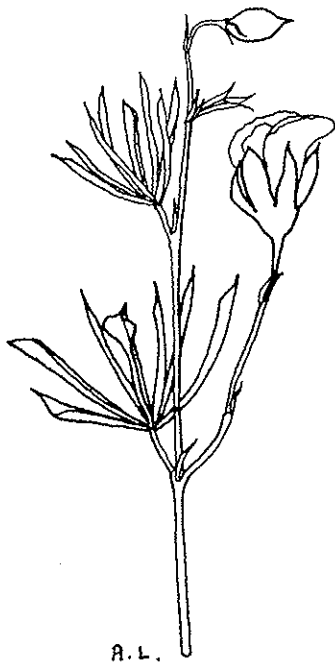
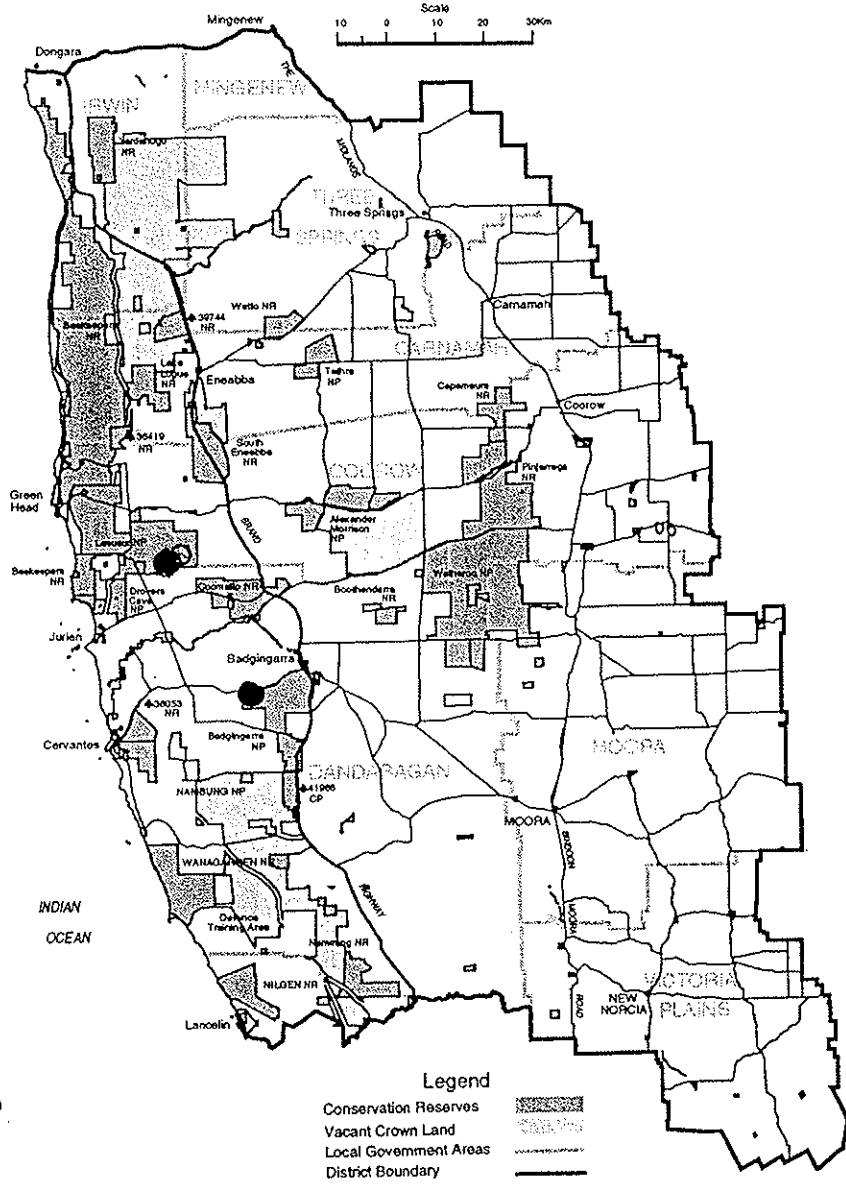
Presumed susceptible

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that population 2 is marked to prevent damage during firebreak maintenance.

### **Research Requirements**

- Further survey is required, particularly in the Lesueur and Badgingarra National Parks.
- Further taxonomic work is required.



1cm

● *Gompholobium* sp. Gairdner Range (E.A.Griffin 2306)

## *Goodenia arthrotricha* F.Muell. ex Benth.

## GOODENIACEAE

This species was described as *Goodenia bonneyana* by Mueller shortly after Bentham's publication of *G. arthrotricha* in 1868. The species is described from material collected by James Drummond without location details. It has been collected only five times since then.

*G. arthrotricha* is an erect perennial herb to 0.3 m with stems, leaves and calyx clothed in glandular hairs which are brownish below the head. The basal leaves are linear-oblanccolate, to 5 cm long, 3-5 mm wide, without stalks. The stem leaves are smaller. The flowers are grouped in inflorescences to 20 cm long, each flower on a stalk 2.5-6 mm long with a linear bracteole at the base. The corolla is blue in colour with a white throat. It is ca. 20 mm long, tubular and split along one side with five unequal winged lobes. There are no outgrowths inside the corolla. The fruit is ovoid to 5 mm long.

**Flowering Period:** October-November

### Distribution and Habitat in the Moora District

This species has been found recently at three localities, one on a nature reserve and two on private land. One of the latter populations is from south of the Moora District in the Wannamal to Bindoon area in the Swan Region.

Grows in loamy gravel or brown loamy sand and granite on slopes, in low heath and in dwarf scrub under low forest.

### Conservation Status

Current: Priority 1

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. S of Moora	VP	Nature Reserve	22.11.1990	Uncommon-WH	-
2. N of Moora	Mo	Private	15.10.1993	Common-WH	Regeneration in area of rehabilitation after mining

### Response to Disturbance

Has been collected from one location which had been burnt the previous summer and in one location was regenerating in area of rehabilitation after mining.

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

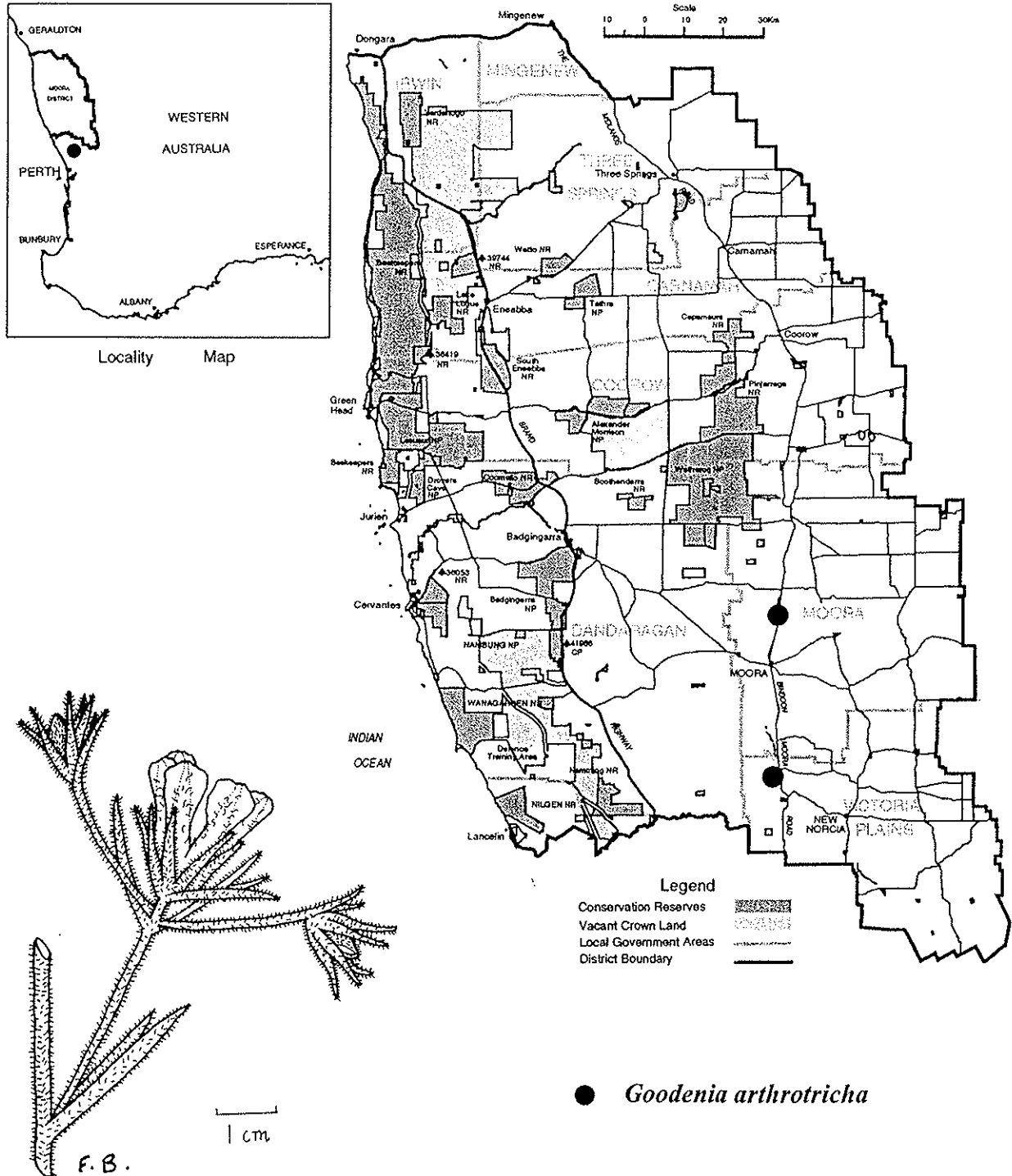
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

## Research Requirements

- Further survey is necessary particularly on conservation reserves in the Bindoon to Wannamal area and to re-find and survey the known populations in the Moora District and Swan Region.

## References

Bentham (1868), Carolin (1990a, 1992), Mueller (1868).



## *Goodenia xanthotricha* de Vriese

## GOODENIACEAE

Yellow-haired Goodenia

An erect, low shrub to 0.5 m tall without basal leaves. The stems and leaves are viscid due to a covering of glandular hairs which are yellowish and not brown below the heads. The leaves are almost sessile, linear or tapering to the base, with dentate margins, 15-35 mm long, 2-7 mm wide. The flowers grow in racemes to 6 cm long with leaf-like bracts and narrow bracteoles. The corolla is ca. 14 mm long, an intense blue-violet in colour, with hairs and outgrowths inside the tube which is split down one side and divided into five equal lobes. The indusium is oblong and the fruit is a cylindrical capsule to 6 mm long.

**Flowering Period:** October, November, January-February

### **Distribution and Habitat in the Moora District**

Endemic to the Moora District where it occurs in the Lesueur area and has been recorded in the past from ca. 25 km further to the south-east. Grows on gravelly hills in shallow sandy soil in low open heath.

### **Conservation Status**

Current: Priority I

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* N of Mt Michaud	D	National Park	12.10.1982	-	-
2.* Mt Lesueur	D	National Park	4.11.1962	-	-
3.* Hill River Spring	-	-	2.1940	-	-

### **Response to Disturbance**

Unknown

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

Unknown

### **Management Requirements**

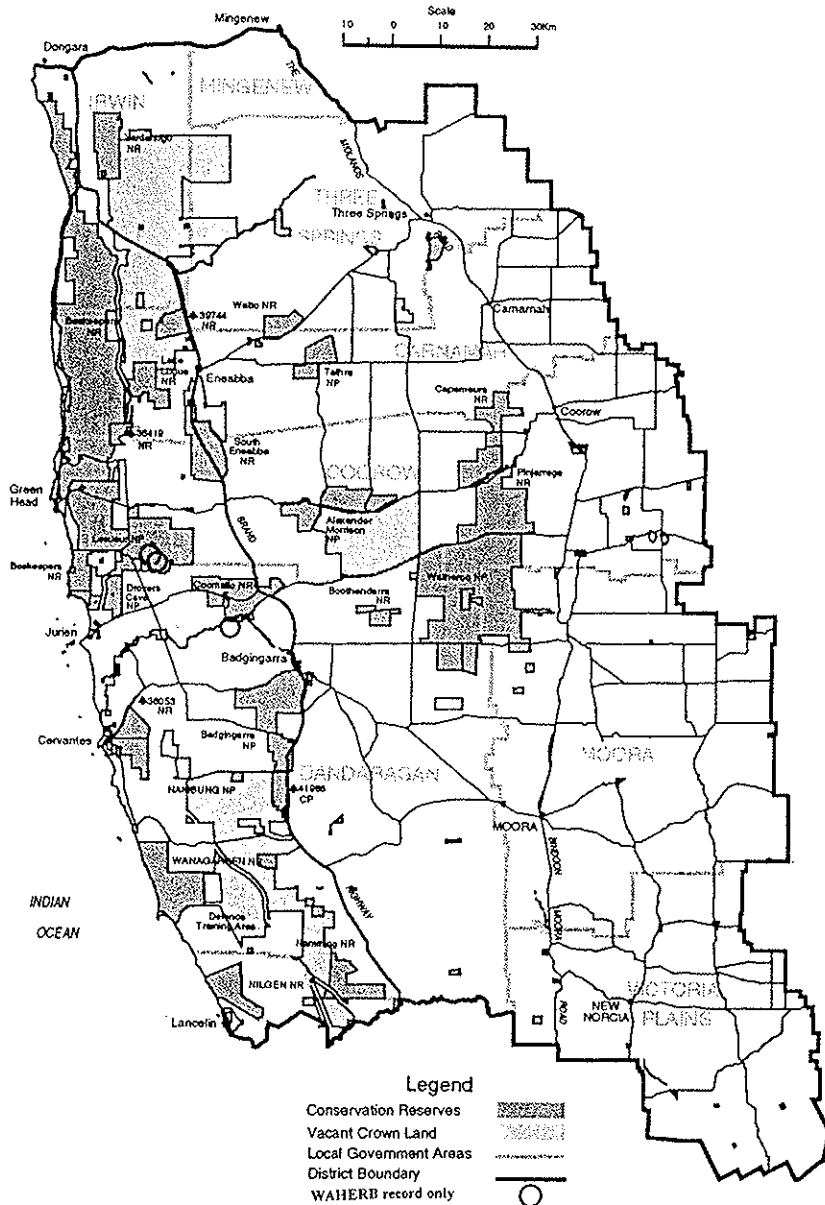
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### **Research Requirements**

- Further survey is required to re-find populations particularly in the Lesueur National Park and in the vicinity of "Hill River Spring", a locality in which it has not been re-found.

### **References**

Bentham (1869), Carolin (1992), Grieve and Blackall (1982).



*Goodenia xanthotricha*



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

PROTEACEAE

[*Grevillea althoferi*, *Grevillea* sp. Eneabba (E.A.Griffin 1448) [aff. *rudis*]]

A recently described species first collected in 1978 and known from few collections.

*Grevillea althoferorum* is a low, spreading, dense shrub to 0.5 m tall and 1 m wide with a lignotuber. The leaves are light blue-green in colour on both upper and lower surfaces. They are up to 7.5 cm long and to 5 cm wide, divided into 3-7 wedge-shaped lobes which have 3-4 apical teeth. The flowers are borne in erect racemes which are little longer than the foliage. Each flower is 5-6 mm long, dull reddish in colour, becoming dull yellow to cream. The fruit are unknown.

Closely related to *G. rudis* but differs in the leaves which are deeply divided into primary lobes which are further divided, and the flower heads which are less compact and little longer than the leaves. The perianth of each flower is shorter and wider than that of *G. rudis* and is either papillose or shortly bearded on the inner surface.

**Flowering Period:** September-early November

### **Distribution and Habitat in the Moora District**

Known from one population south-west of Eneabba but has been collected in the past from a site now destroyed by mining ca. 5 km further east. A new population has also been found recently in the Perth District near Bullsbrook in an area which is affected by *Phytophthora* sp.

Grows in grey sand and pale brown gravelly loam sometimes on low rises, in low heath with *G. integrifolia*, *Lambertia multiflora* and *Banksia*, *Jacksonia*, *Hibbertia*, *Eucalyptus* and *Actinostrobilus* species.

### **Conservation Status**

Current: Priority 1<sup>#</sup>

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Eneabba	Ca	Road Reserve	30.5.1994	50+	Some weed infestation
2.* S of Eneabba	Ca	VCL (Mining Lease)	2.11.1978	-	Site now destroyed by sand mining

### **Response to Disturbance**

Unknown

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

Presumed susceptible

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that the only known population is marked and maintain liaison with land managers.

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

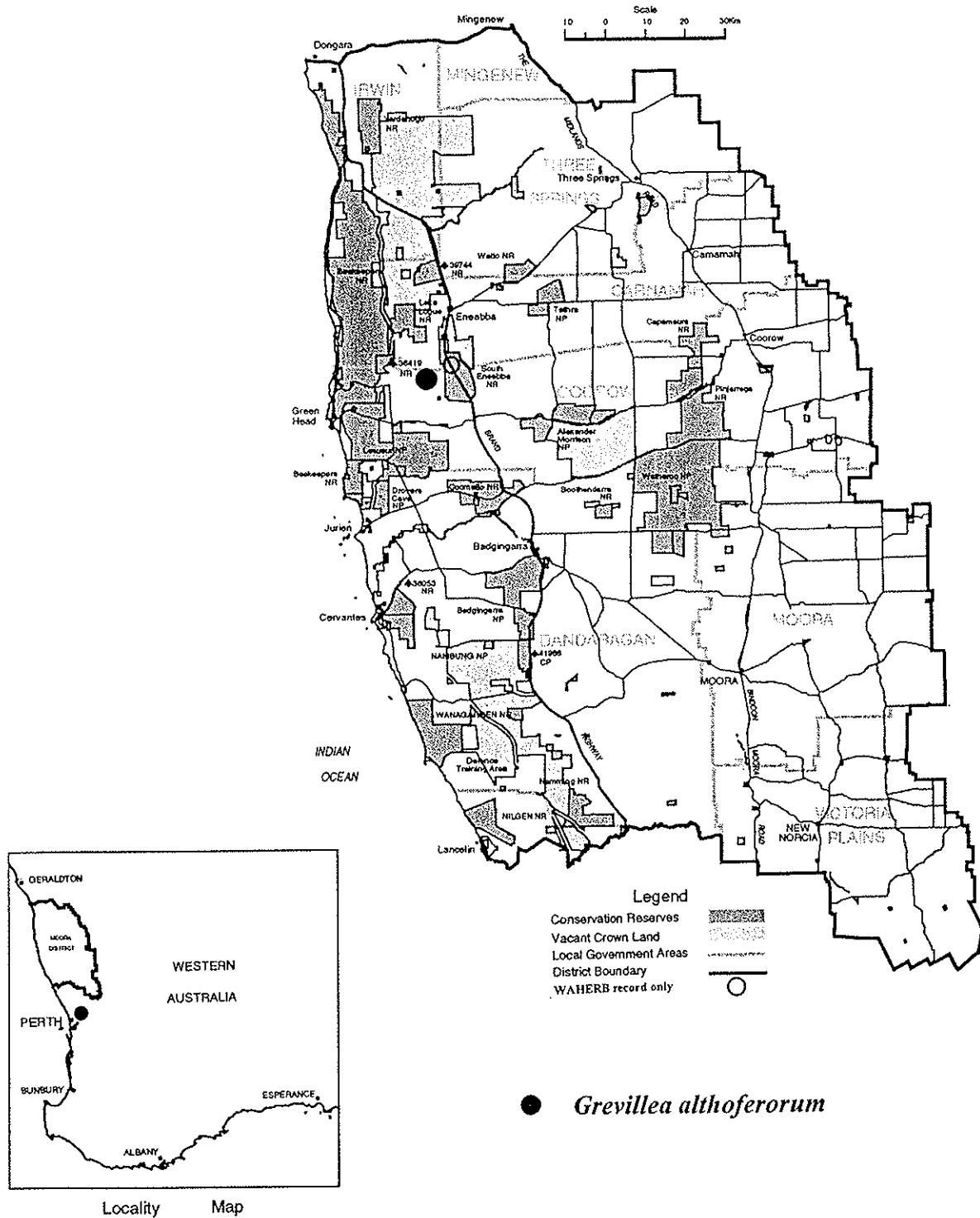


## Research Requirements

- Further survey is required, particularly on conservation reserves.

## References

Olde and Marriott (1993, 1995).



A low shrub to 2.5 m tall sometimes with prostrate vegetative branches and upright flowering growth and with sparsely hairy stems. The leaves are 1-4.5 cm long with up to 5 lobes, trifid or simple, often curving upwards. The leaf segments are linear to narrowly obovate, sometimes slightly hairy. The upper surface of the lobes has a channel along the midvein or is flat, with the midvein never prominent. The ultimate lobes are never more than 2 cm long. The flowers are in axillary or terminal inflorescences 1-3 cm long, with cream flowers ca. 3 mm long, on stalks 7-10 mm long. The perianth is hairless on the outside with few or no hairs on the inner surface. The style has a conspicuous stylar swelling and the pollen presenter is obliquely conical to apiculate, longer than broad. The fruits are oblong to 1.3 cm long, with a rough surface.

This species has been separated into two subspecies which differ in the degree of division of the leaves. However, the specimen collected at Badgingarra in the Moora District has not been sighted recently and its identification to subspecies is not known.

A prostrate form of this species is commonly cultivated as *Grevillea biternata* or *G. tridentifera*.

**Flowering Period:** August-October

#### **Distribution and Habitat in the Moora District**

This species occurs mainly in the Bullsbrook-Muchea area north of Perth in the Swan Region. However a collection of the species was made in 1960 from Badgingarra in the Moora District. This population was not refound during this survey. It has also been collected from south of Eneabba, although there is some doubt as to whether this is a natural occurrence.

There are no details of habitat available for the Badgingarra collection. In the Swan Region this species grows on sand or sandy loam in winter wet areas, in heath or open woodland.

#### **Conservation Status**

Current: Priority 1<sup>#</sup>

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* S of Eneabba	Ca	-	9.1992	-	Possibly an escape from garden planting
2.* Badgingarra	D	-	9.1960	-	-

#### **Response to Disturbance**

Unknown

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

Presumed susceptible

#### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

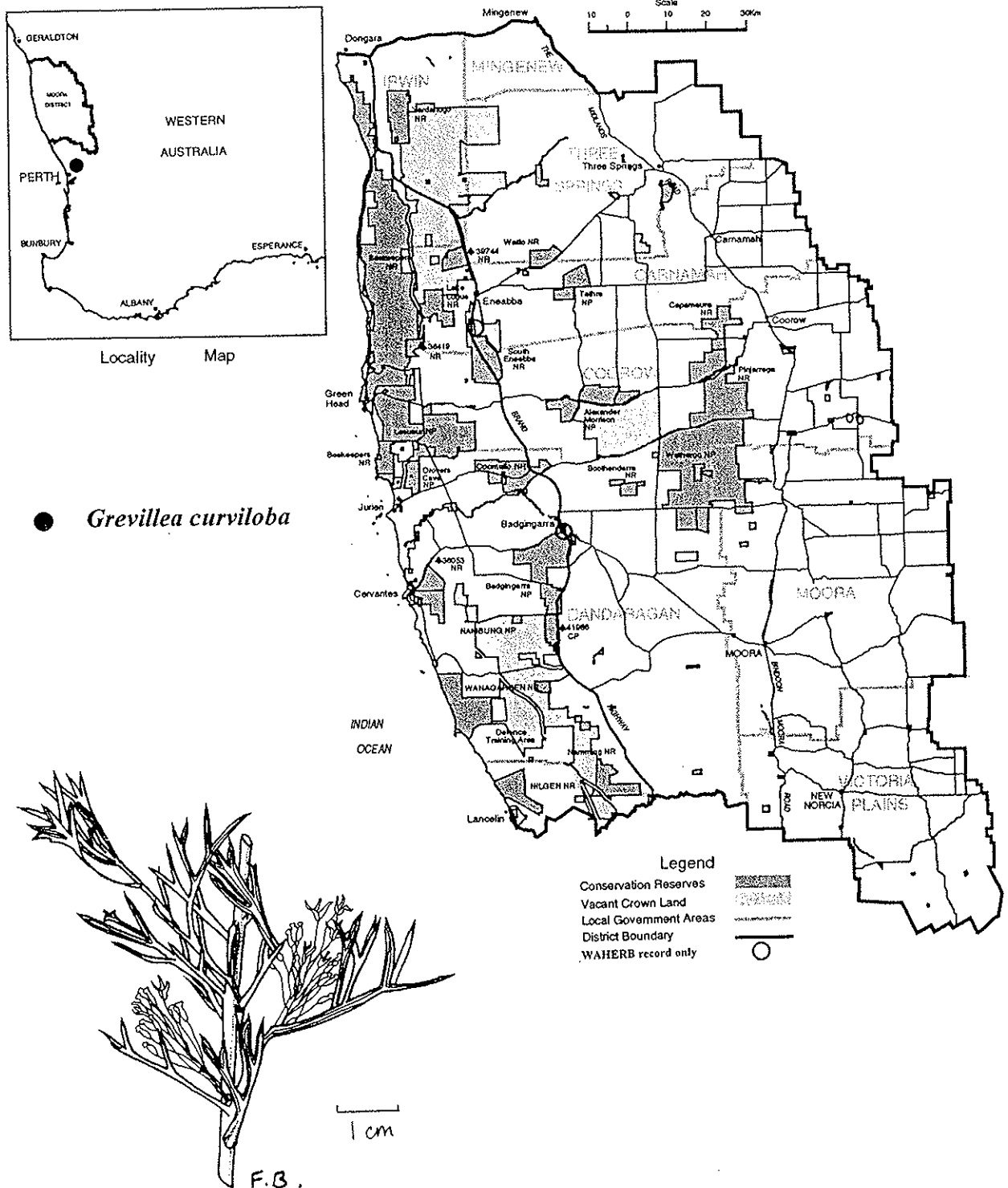
<sup>#</sup> now Declared Rare Flora (updated at December 1999)

## Research Requirements

- Further survey is required in suitable habitat in the Moora District.

## References

Elliot and Jones (1980-1990), McGillivray (1993), Olde and Marriott (1995).



*Grevillea delta* (McGill.) P.Olde & N.Marriott

PROTEACEAE

[*G. thelemanniana* Huegel ex Endl. subsp. *delta* McGill.]

A spreading shrub to 1.7 m tall, with long, spreading hairs more than 1 mm long on the branchlets. The leaves are 0.5 to 1.5 cm long, pinnately divided, with many linear lobes and sometimes with the lower lobes divided but numbering less in total than 20 per leaf. They are grey-green in colour and glabrous, the upper surface with only the midvein apparent, the apex acute to blunt, sometimes mucronate. The flower heads are usually simple and axillary. The flowers are scarlet in colour, the perianth with few hairs outside, somewhat hairy on the inner surface. The pistil is 19.5-28 mm long and is glabrous, as is the ovary. The pollen presenter is oblique and convex. The fruits are erect, oblong in shape, with the styles persistent.

Related to *Grevillea thelemanniana* and can also be confused with *G. humifusa* and *G. preissii*. Distinguished by its height, by the spreading hairs which are more than 1 mm long on the branchlets and by the pinnate leaves with the lower lobes sometimes divided, so that the ultimate lobes are numerous, usually up to 10. The leaves are 0.5-1.5 cm long.

**Flowering Period:** July, September-October

**Distribution and Habitat in the Moora District**

Endemic to the Moora District, occurring over a range of ca. 10 km in the Lesueur area.

Grows in brown loamy clay or grey gravelly soil over sedimentary rock along seasonal drainage lines typically in wandoo woodland. Also recorded from slopes of breakaways among sandstone outcrops in brown sandy loam in low heath with mallees and open low woodland of *Banksia tricuspis*. It is reported to be common in places (E. Griffin, personal communication).

**Conservation Status**

Current: Priority 1

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Mt Lesueur	D	National Park	23.9.1992	15+	Partly disturbed
2.* E of Mt Peron	D	National Park	25.7.1980	-	-
3.* N of Mt Lesueur	Co	National Park	14.9.1979	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

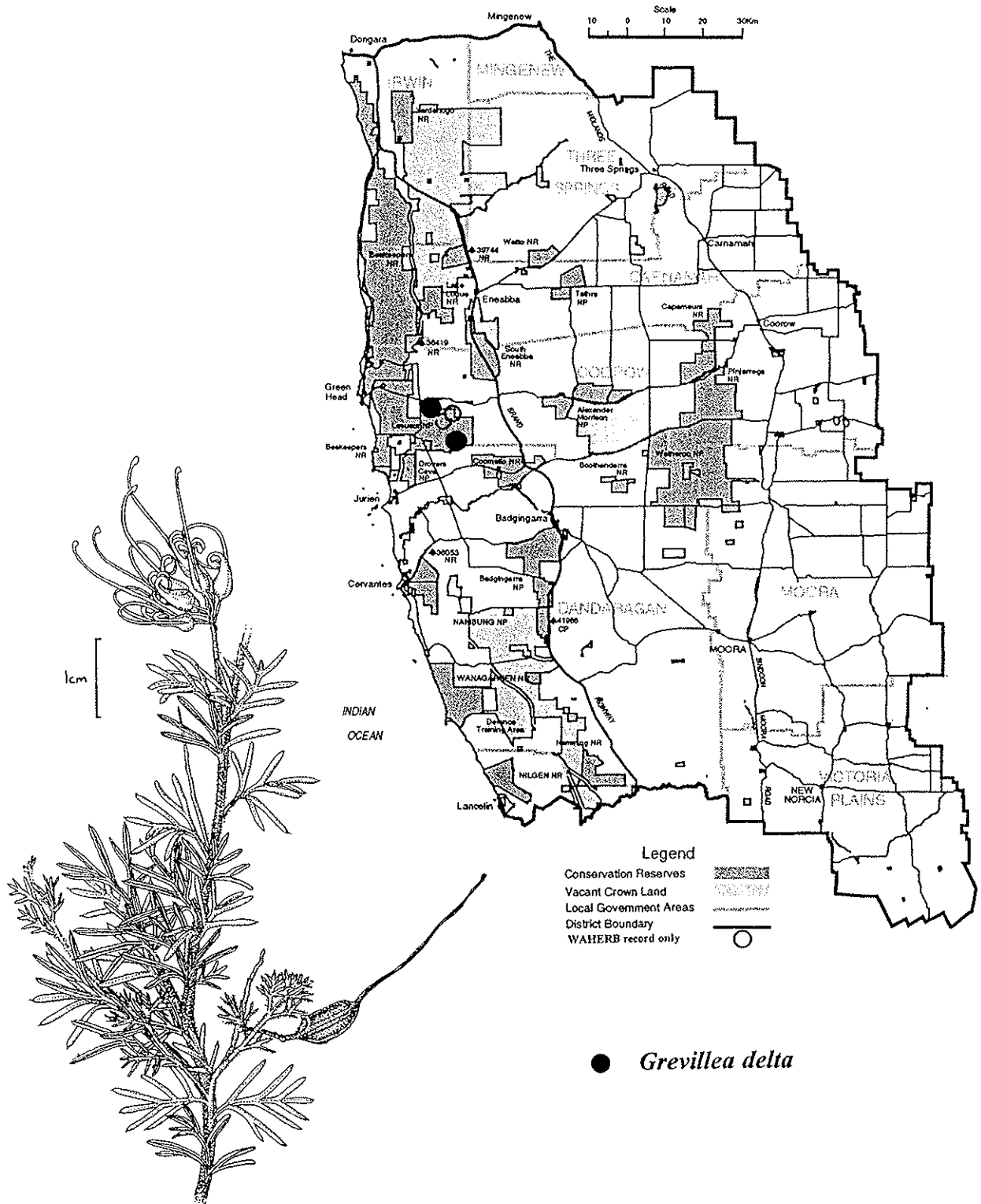
**Research Requirements**

- Further survey is required over the known range of occurrence to determine the full extent of populations and numbers of plants.

**References**

McGillivray (1993), Olde and Marriott (1995).

Illustration by M. Pieroni.



*Grevillea humifusa* P.Olde & N.Marriott

PROTEACEAE

[*Grevillea* sp. Eragilga (P.Olde 9196) [aff. *preissii*]]

A prostrate, lignotuberous shrub with trailing stems to 3 m long. The branchlets are angular and pilose with long white hairs. The leaves are twice divided, the upper surface with long, soft hairs. The flowers are grouped in a one-sided short head. Each flower is hairless on the outside but hairy inside. The perianth is pink to pale red with a cream limb. The pistil is glabrous with an oblique pollen presenter. There are strong basal ridges on the fruit.

This taxon is common in cultivation under the name *Grevillea thelemanniana* prostrate form.

**Flowering Period:** May, July-September

**Distribution and Habitat in the Moora District**

Known only from east of Jurien Bay in one road reserve population which extends back onto private property.

Grows in brown, gravelly clay loam on lower hill slopes in woodland of *Eucalyptus wandoo* and *E. loxophleba* with tall shrubs of *Viminaria juncea* and low shrubs, including *Acacia reflexa* and *Scaevola glanduligera*.

**Conservation Status**

Current: Priority 1<sup>#</sup>

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. E of Jurien	D	Shire Road Reserve, Private	15.5.1994	100+	Some plants on road reserve dead, possibly due to drought.

**Response to Disturbance**

Regenerates from seed or lignotuber.

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that road markers are in place.
- Maintain liaison with shire and landowner.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

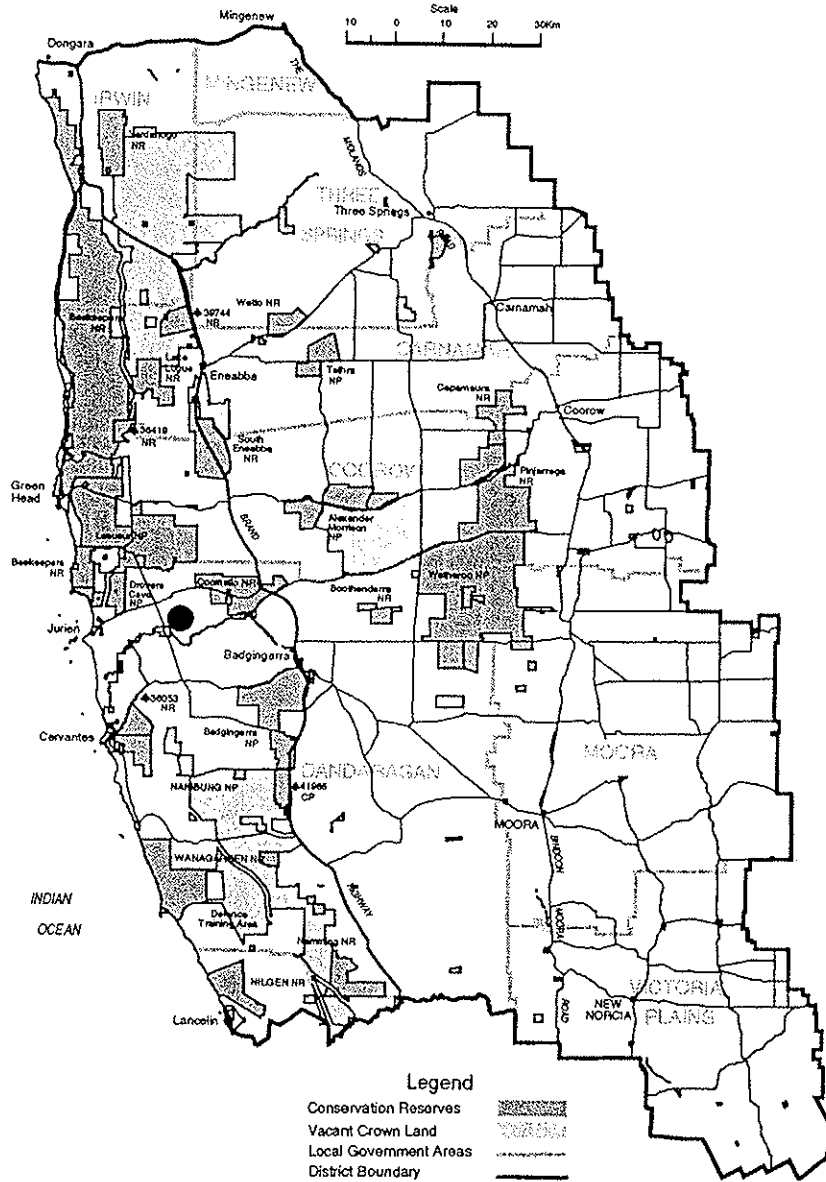
**Research Requirements**

- Further survey is required.

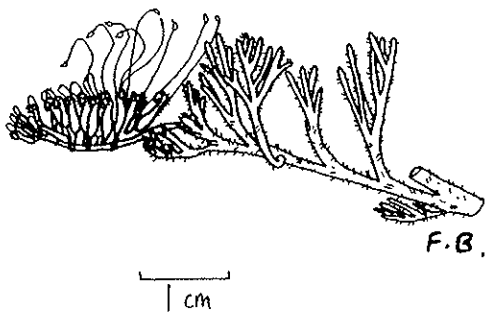
**References**

Elliot and Jones (1980-1990), Olde and Marriott (1995).

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



● *Grevillea humifusa*



## *Grevillea murex* McGill.

## PROTEACEAE

An upright, much-branched shrub 1-2 m tall with somewhat hairy branchlets. The leaves are 8-10 mm long and have stalks to 1.5 mm long. They are divided into 4-5 linear to oblong lobes with blunt tips. The flower heads are dome-shaped, at the ends of the branches, 1-2 cm long and ca. 2 cm across. The flowers are cream to yellow in colour, hairless on the outside and ca. 3 mm long, with the pistil 9-10 mm long, the ovary glabrous and the pollen presenter oblique and almost flat. The fruits are oblong to ellipsoid, 9-13 mm long, with thick coats and covered with irregular spiny protuberances to 2.5 mm high. These give the fruit the appearance of a murex shell.

Related to *Grevillea crithmifolia* but differs in the hairy branchlets, smaller leaves, flat torus and seed pod with a hard coat with conspicuous irregular projections.

**Flowering Period:** August-September

### **Distribution and Habitat in the Moora District**

Occurs in the Moora District in a restricted area over 6 km north-east of Arrino but also occurs 8 km further north in the Geraldton District north-east of Yandanooka.

Grows in open York gum woodland over open low scrub with grasses and herbs on lateritic gravel and brown clay loam or red clayey sand on gentle lower valley slopes or flat areas. Associated species include *Eucalyptus loxophleba*, *Allocasuarina campestris*, *Calothamnus* and *Melaleuca* species.

The population east of Yandanooka is of ca. 50 plants. All populations are on narrow road reserves, disturbed and with weed infestation.

### **Conservation Status**

Current: Priority 1<sup>#</sup>

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. NE of Arrino, Drew Road	TS	MRWA Road Reserve, Private	24.9.1990	20	Partly disturbed
2. NE of Arrino, Bligh Road	TS	Shire Road Reserve	24.9.1990	150 est.	Partly disturbed with weed infestation

### **Response to Disturbance**

Unknown

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

Presumed susceptible

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that both populations are marked.
- Maintain liaison with Shire and MRWA.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

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

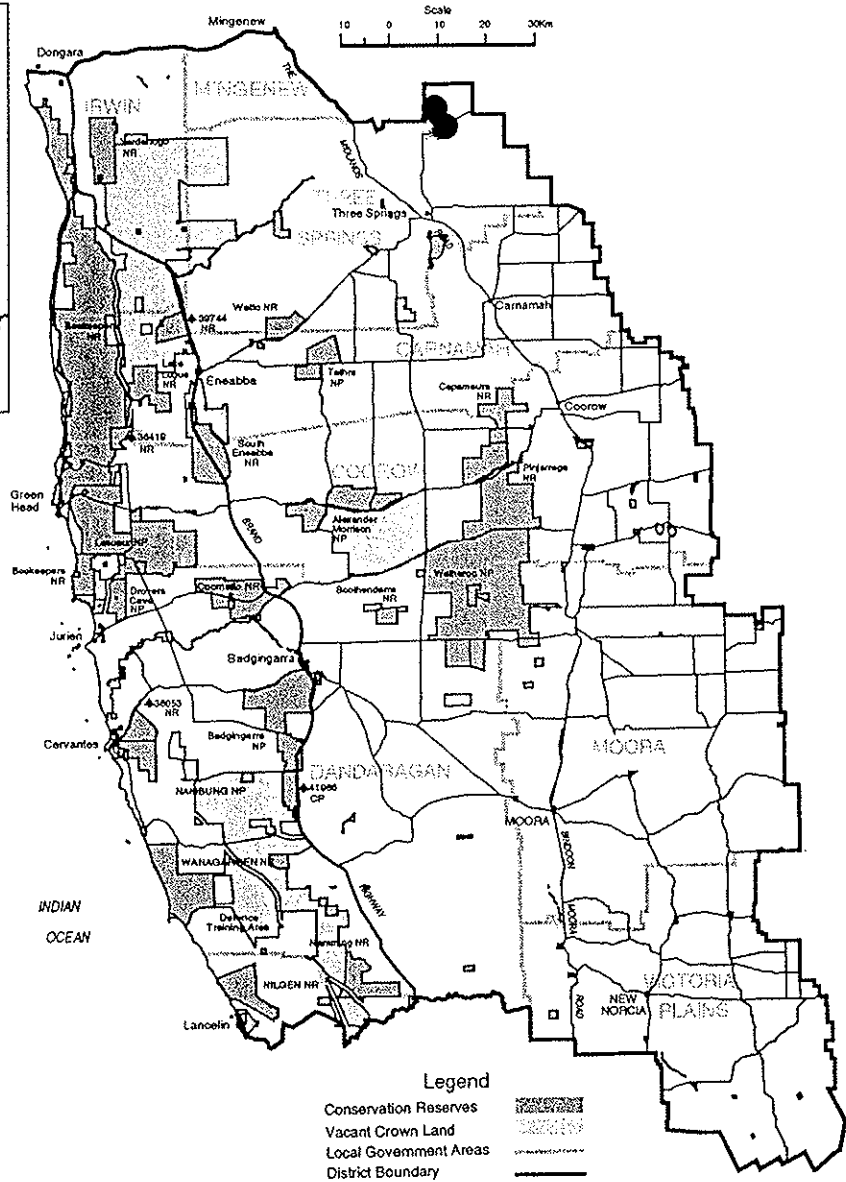
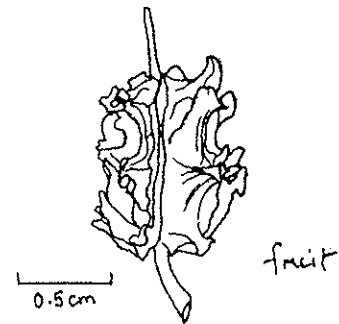
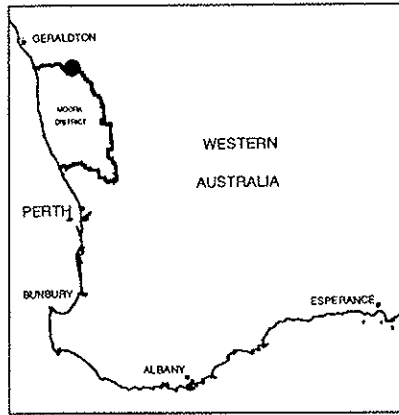


## Research Requirements

- Further survey is required on conservation reserves and other remnant vegetation in the area.

## References

McGillivray (1993), Olde and Marriott (1995).



● *Grevillea murex*

A. L.

## *Grevillea pinifolia* Meisn.

PROTEACEAE

### Pine-leaved Grevillea

An erect, much-branched shrub to 0.6 m high with slightly hairy branchlets. The leaves are erect and rather crowded, simple and entire, linear with a minute point, subterete with a lateral groove along each side, the surface smooth. They are 2.5-5 cm long, 0.5-0.7 mm wide. The flowers are in umbel-like 1-4 flowered racemes which are axillary and stalkless, ca. 1 cm long. The flowers are bright red in colour with the perianth villous on the outside and partly within. The pistil is 7.5-8.5 mm long and most of the style is concealed by the perianth at anthesis. The nectary is U-V shaped, reniform or pulvinate, enclosed within the torus or protruding less than 1 mm laterally beyond the rim. The stipe of the ovary is 1.6-1.9 mm long, the ovary is villous and the style is villous at the base, with short hairs along most of the style. The fruits are not known.

**Flowering Period:** July-October

#### **Distribution and Habitat in the Moora District**

Has been recorded between Coorow, Miling and Bindi Bindi on the eastern side of the Moora District and in the Eneabba area and further east at Wubin in the Merredin District. However, the most recent collection in the Western Australian Herbarium was made in 1972 and the species was not searched for during the survey as it is a recent addition to the Priority Flora List. It has been photographed more recently (Olde and Marriott 1995).

Grows in scrub on lateritic rises in yellow sand or sandy gravel in scrub, sometimes with a few emergent trees.

#### **Conservation Status**

Current: Priority 1

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* Coorow	Co	-	14.9.1932	-	-
2.* E of Bindi Bindi	Mo	-	12.8.1972	-	-
3.* Between Miling and Pithara	-	-	8.7.1931	-	-
4.* N of Miling	-	-	8.7.1931	-	-
5.* Eneabba area	-	-	20.7.1971 KP	-	-

#### **Response to Disturbance**

Regenerates from seed.

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

Presumed susceptible

#### **Management Requirements**

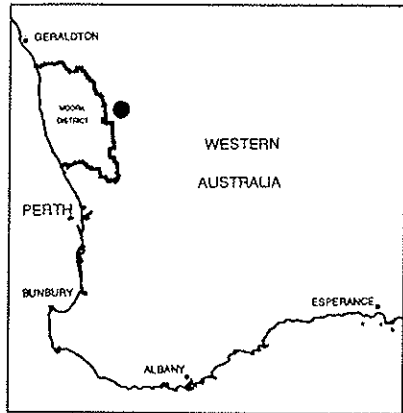
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

**Research Requirements**

- Survey is required throughout the range of the species in the Moora and Merredin Districts.

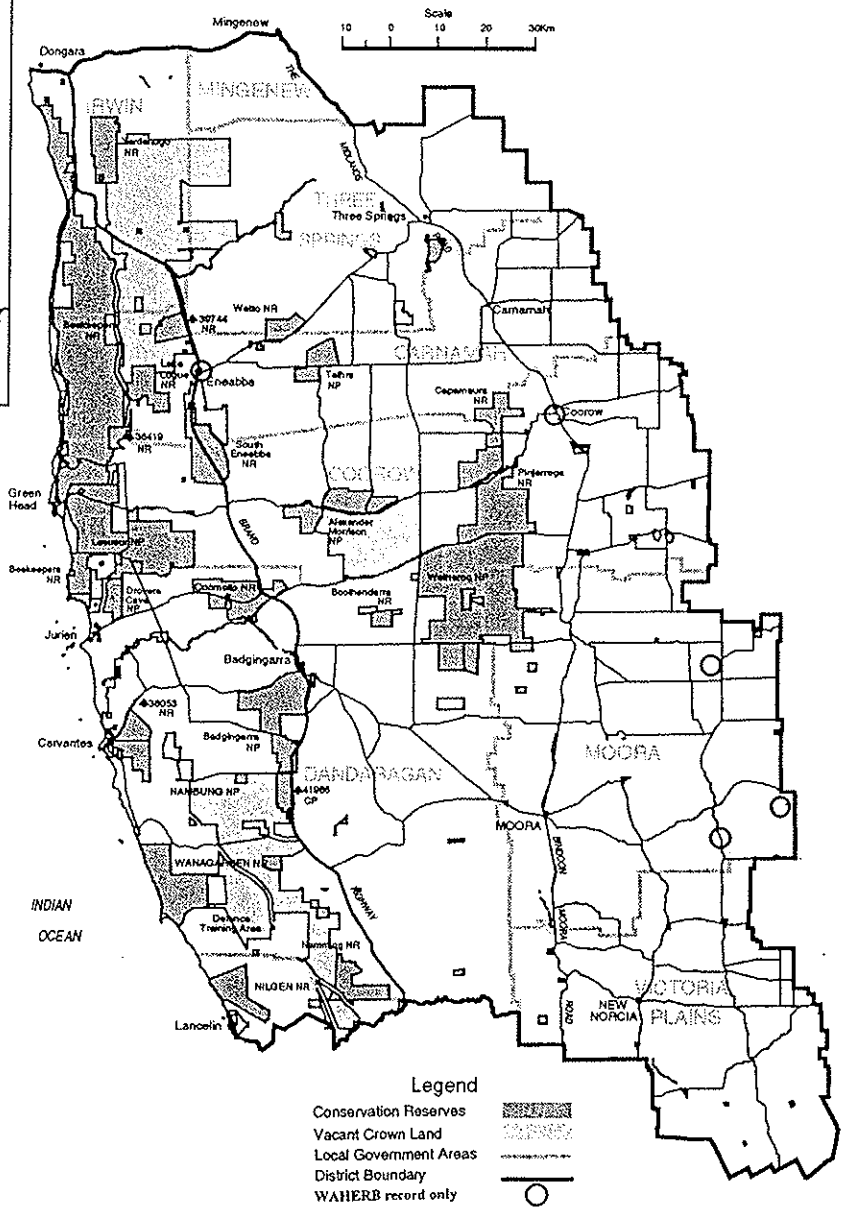
**References**

Bentham (1870), McGillivray (1993), Olde and Marriott (1995).



Locality Map

● *Grevillea pinifolia*



A low, spreading shrub to 0.6 m, with erect branches. The leaves are divided into 5-7 segments which are narrow-linear with sharp points. The leaf margins are smoothly rolled back concealing the lower surface and appearing doubly-grooved beneath. The leaf lobes are up to 2.5 cm long. The flower heads are terminal, erect or irregularly curved, simple or once-branched and rather dense. They are pendant or lie on the ground around the plant. The flowers are orange in colour with pedicels 2-5 mm long, the perianth to 1 cm long. The outside of the perianth has an indumentum more sparse towards the almost hairless limb and the inner surface is glabrous. The torus is very oblique. The pistil is 23-34 mm long, the ovary with a short stipe and is somewhat hairy, the hairs extending for ca. 4 mm up the style. The pollen presenter is oblique and broadly conical. The fruit are ca. 1 cm long and hairy.

This species is closely related to *Grevillea erectiloba* but differs in the smaller leaves and flowers, glabrous style and the ovary, which is almost sessile. The leaf segments are flattened, not terete and are rigidly divaricate.

**Flowering Period:** August-October

#### **Distribution and Habitat in the Moora District**

This species was collected from near Dandaragan in the Moora District by Gardner in 1932. A more recent collection from the Irwin River may have been made within the District but there is no precise location information.

Has also been recorded from the Wongan Hills to Jibberding area in the Merredin District, and in the Pindar to Tardun and Morawa to Mullewa areas in the Geraldton District where it is recorded from a nature reserve.

In the Kirwan area it has been recorded growing in sand associated with granite outcrops. In the Morawa-Mullewa area it grows near granite rocks in red clay-loam, in heath with dominant species of Myrtaceae.

#### **Conservation Status**

Current: Priority 1

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* Near Dandaragan	D	-	9.1932	-	-
2.* Irwin River, N Moora	-	-	1.9.1982	-	-

#### **Response to Disturbance**

At a population in the Geraldton District, it was observed that many young plants (seedlings) were growing in an area which had been disturbed a few years previously. It is killed by fire and regenerates from seed (Olde and Marriott 1995).

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

Presumed susceptible

#### **Management Requirements**

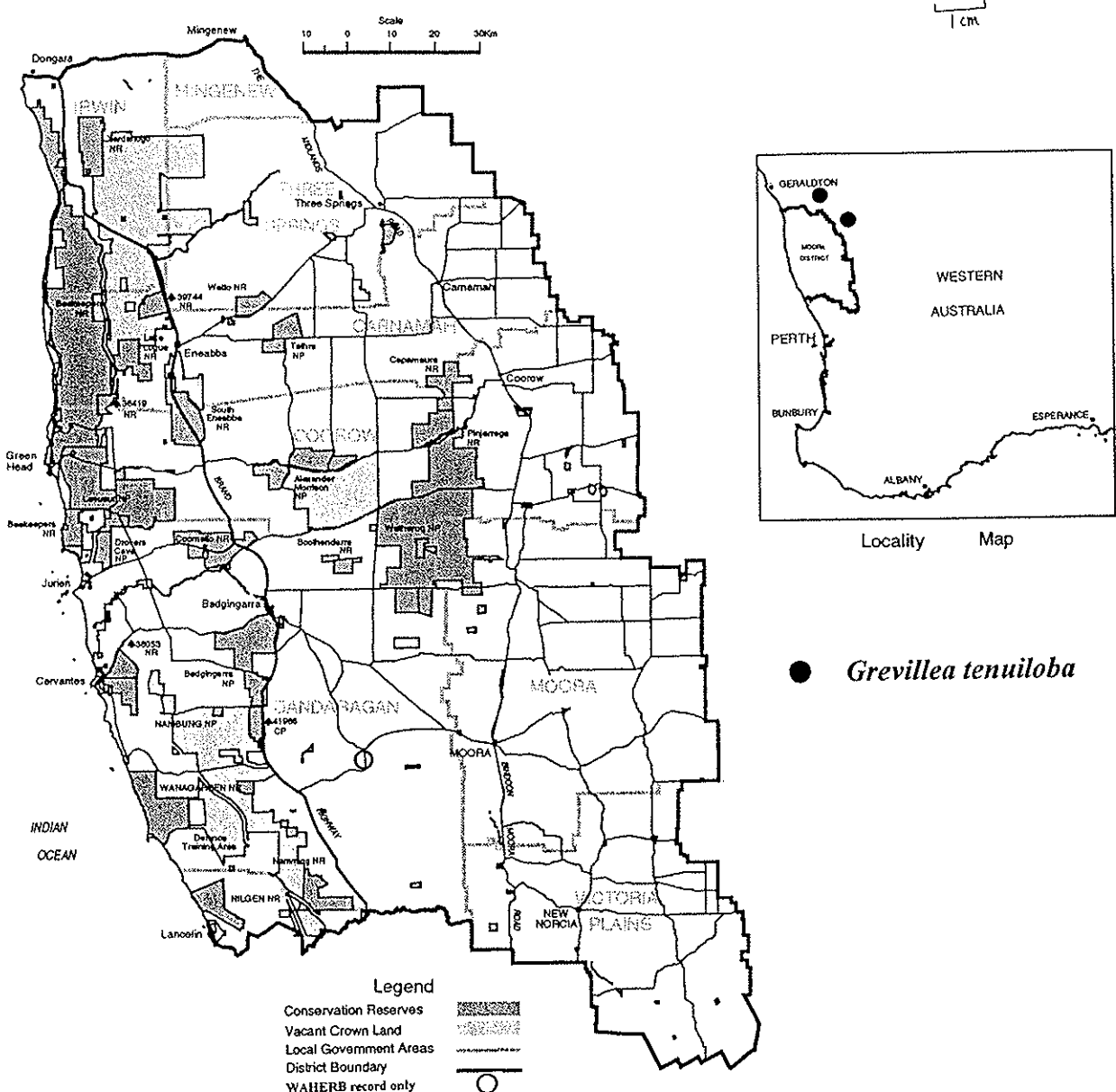
-- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required.

**References**

Gardner (1934), McGillivray (1993), Olde and Marriott (1995).



● *Grevillea tenuiloba*

*Grevillea thyrsoides* Meisn. subsp. *pustulata* P.Olde & N.Marriott      PROTEACEAE

A low diffuse shrub to 60 cm tall with the branches and flowers often prostrate. The leaves are pinnately compound, stiff and mostly less than 5 cm long, 2.5-4 cm with shorter, more closely aligned lobes than those of the typical subspecies, which are 9-32 mm long. The margins of the leaf lobes are rolled back. There is a basal pimple-like protuberance on the underside of the leaf lobes at the base. The floral bracts are 2-5.3 mm long, shorter than those of the typical subspecies. The flowering heads are 2.5-11 cm long, terminal on trailing peduncles. The flowers are pink, dull red or crimson in colour, the perianth with hairs on the outside and longitudinally ribbed, hairless on the inside, 7-8 mm long. The pistil has spreading hairs and is 24-33 mm long, with a stipe. The style is curved with an oblique pollen presenter.

McGillivray (1993) distinguishes two forms of *Grevillea thyrsoides*, a longer-leaved form and a shorter-leaved form, in which the leaf lobes of the former are also spreading rather than closely aligned. Olde and Marriott (1993) recognise these forms as subspecies on the basis of length of leaf lobes, the presence of the protuberance on the underside of the shorter-leaved form and the disjunct distribution of the two forms.

**Flowering Period:** All year

**Distribution and Habitat in the Moora District**

This subspecies occurs in the Moora District between Coorow and Watheroo, whereas the typical subspecies is found further to the west between Badgingarra and Jurien Bay. It has been reported to have been found recently at Gunyidi (E. Griffin, personal communication).

Grows in sandy gravel, loam or quartzite soil, in low heath and mallee shrubland.

This taxon was not surveyed as it was not included in the Reserve List until 1994. Olde and Marriott (1995) state that it survives in a largely cleared area mainly on road reserves.

**Conservation Status**

Current: Priority 1

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* S of Gunyidi	Co	-	29.7.1980	-	-
2.* Coorow	Co	-	10.8.1949	-	-
3.* Arra Hill	Co	-	3.9.1987	-	-
4.* N of Marchagee	Co	-	4.5.1970	-	-
5.* S of Marchagee	-	-	31.8.1965	-	-
6.* Watheroo	-	-	12.1934	-	-
7.* N of Marchagee	Co	-	12.7.1963	-	-

**Response to Disturbance**

Regenerates from seed.

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

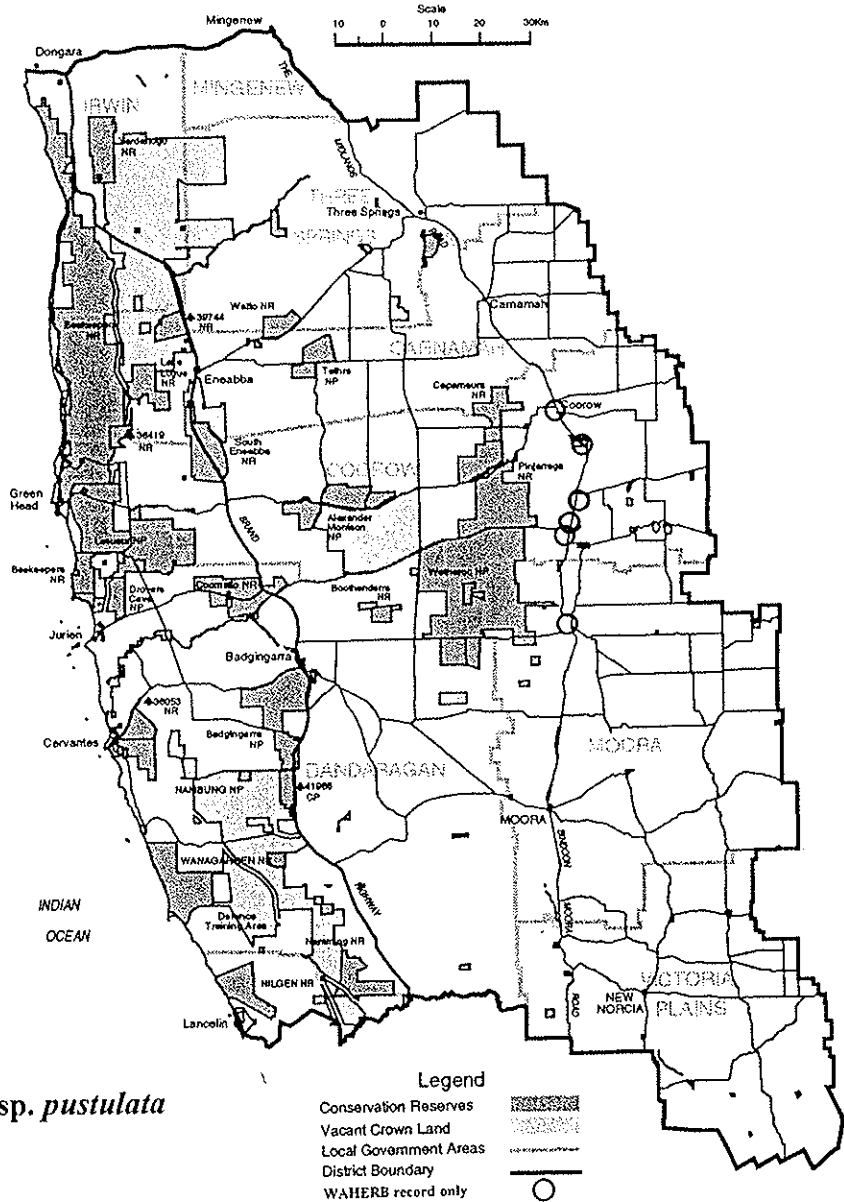
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

**Research Requirements**

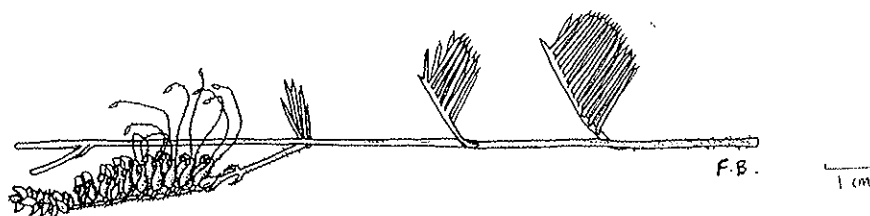
- Survey for this subspecies is required, particularly on reserves between Coorow and Watheroo.

**References**

McGillivray (1993), Olde and Marriott (1993, 1995).



*Grevillea thyrsoides* subsp. *pustulata*



## *Haloragis foliosa* Benth.

## HALORAGACEAE

A perennial herb or subshrub, rounded and multistemmed, to 50 cm tall, the stems woody at the base and with a taproot. The plant is rough to the touch, with curved 2-4 celled hairs, 0.2-0.4 mm long. The leaves are alternate, sessile, narrowly lanceolate to narrowly ovate, serrate mainly in the upper part. They are bright green in colour, 3-4.5 cm long, 0.2-0.4 cm wide.

The flowers are grouped 1-3 in the axils of the upper leaves and primary bracts. The secondary bracts are fleshy and keeled. The four sepals do not exceed the four petals in the mature flower. They are ovate, to 1.9 mm long, 1.2 mm wide. The petals are hooded and keeled, to 3.2 mm long, 1.3 mm wide. There are 8 stamens and four clubbed styles. The fruit is an indehiscent oblong nut, to 1.8 mm long, four-angled with narrow wings on the angles. It is 4-locular with one seed per locule.

This species is closely related to *Haloragis acutangula* but differs in the sepals which are larger and subcordate, not deltoid in shape, and in the secondary bracts, which are fleshy and keeled, not membranous and without a midrib.

**Flowering Period:** October-November

### Distribution and Habitat in the Moora District

The species is known from two populations south of Dongara in approximately the same locations as earlier populations were found in 1974. Another population occurs near Cervantes ca. 100 km further south. These populations all occur on coastal limestone. The species has not been collected apart from at these populations except for James Drummond's collection made between the Moore and Murchison Rivers and a collection from Winchester on the eastern side of the District in 1968. That area was searched but the population was not refound. As it was recorded from the railway reserve it may possibly have been an introduction from a coastal area.

In 1991 and 1992 this species was found at ten locations but was found to be common at only one of these. These ranged from Illawong to south of Cervantes and occurred in two nature reserves and a national park (E. Griffin, personal communication).

Grows in shallow white or grey to yellow sand or brown loam over limestone in low coastal heath. Associated species include *Acacia rostellifera*, *Melaleuca huegelii* and *M. acerosa*.

### Conservation Status

Current: Priority 1

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Near Cliff Head, south of Dongara	I	Shire Road Reserve	6.1.1992	50 est.	Good, plants growing on graded road edge
2. Near Illawong, south of Dongara	Ca	Shire Road Reserve	30.4.1992	200+	Good, plants growing on graded road edge
3.* ENE of Cervantes	D	Nature Reserve	29.10.1991	-	-
4.* Winchester	Ca	Railway Reserve	10.1968	-	-

### Response to Disturbance

Two recently surveyed populations were found on scraped road edges with little other vegetation.



## Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

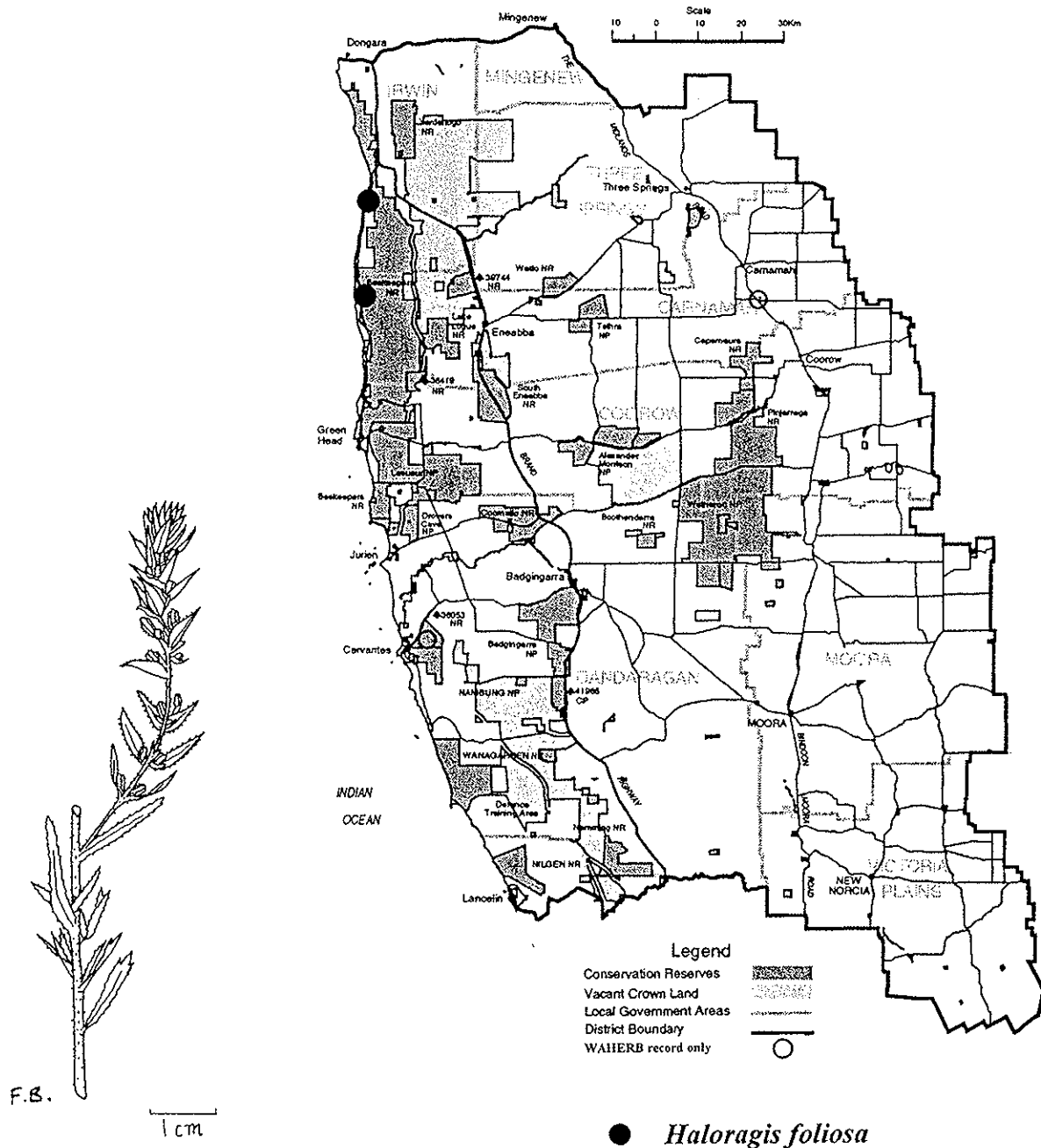
- Ensure that road markers are in place at populations 1 and 2.
- Ensure that dieback hygiene procedures are carried out at all populations.

### Research Requirements

- Further survey is required, particularly to refind population 3 and survey fully, and to survey populations recorded in 1991-1992.

### References

Orchard (1975, 1977, 1990).



*Halosarcia koobabbiensis* Paul G. Wilson ms

CHENOPODIACEAE

[*Halosarcia* sp. Coorow (P.G. Wilson 12750)]

A perennial plant to 20 cm high, with erect branches which are reclining at the bases. The segments (articles) are large, ca. 8 mm long, light green and glaucous. The flowering spikes are terminal, with up to 10 articles, and the flowers are conspicuous. The fruiting perianth is dry and papery. The seed is broad ovoid in shape, compressed and somewhat corrugate in a concentric pattern. It is reddish-brown in colour.

The distinguishing features of this species include the habit, shape of the articles and colour and corrugations on the seed. This species is part of the *Halosarcia pergranulata* complex, in which there appear to be other new taxa and which is in need of revision (P.G. Wilson, personal communication).

**Flowering Period:** October

**Distribution and Habitat in the Moora District**

Known from one location to the south-east of Coorow.

Occurs on the upper margins of a salt lake on yellow clayey sand, growing as the dominant species, associated with *H. halocnemoides*, *H. lylei*, *Melaleuca uncinata* and *Gunniopsis* sp.

**Conservation Status**

Current: Priority 1

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SE of Coorow	Co	Private	16.10.1991	900 est.	Undisturbed

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

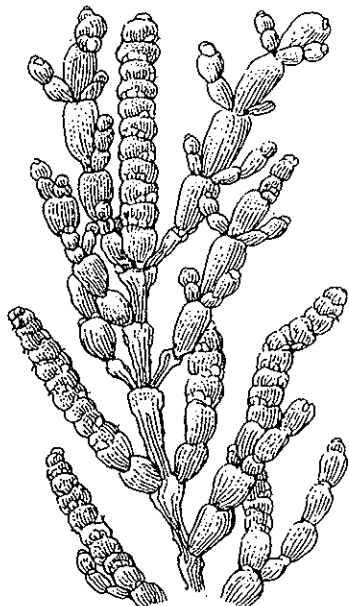
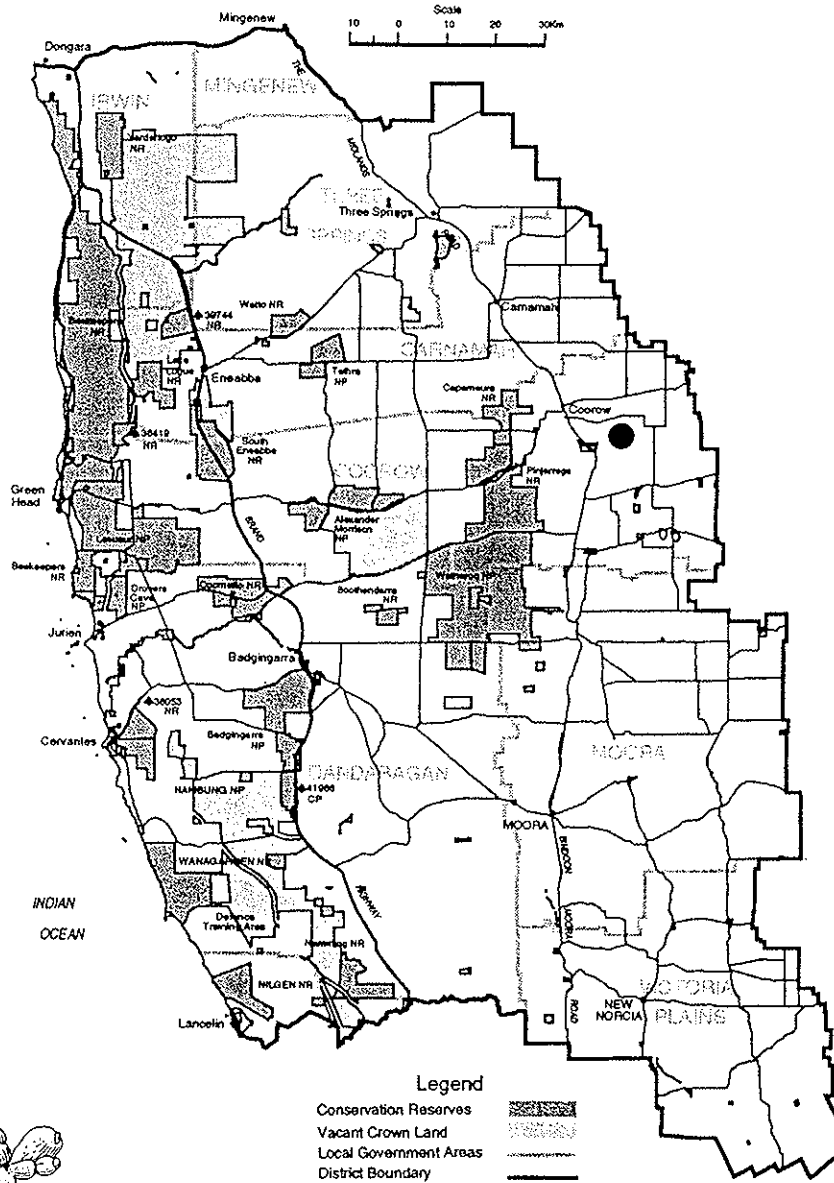
**Management Requirements**

- Maintain liaison with landowners.
- Ensure that dieback hygiene procedures are carried out at population.

**Research Requirements**

- Further survey is required.
- Further taxonomic work is required in the *H. pergranulata* complex.

Illustration by M. Menadue.



● *Halosarcia koobabbiensis* ms

## *Homalocalyx chapmanii* Craven

## MYRTACEAE

*Homalocalyx chapmanii* is an erect shrub to 50 cm tall. The leaves are small and alternate with very short petioles. They are narrowly oblong to obovate, to 3.5 mm long and to 1.3 mm broad. Stipules are present. There are 3-20 inflorescences, clustered, in the lower leaf axils of new growth, the shoot apex continuing growth. Each flower has a pair of persistent bracteoles joined to form the cheiridium. There are bud scales present. The hypanthium is short, pubescent with 10 ribs and the apex of the ovary is concave. There are five reflexed and persistent sepals which are rounded, with an irregularly toothed edge, to 7.2 mm long. The five petals are magenta to light purple in colour, rounded, to 3.5 mm long. There are 40-50 stamens with the filaments the same colour as the petals. The style is persistent. The fruit is dry and indehiscent with one seed.

**Flowering Period:** September-October

### **Distribution and Habitat in the Moora District**

The species has been collected several times from the area north-east of Eneabba but was not fully surveyed as it is a recent addition to the Priority Flora List. It also occurs in the Northampton to Hutt River area.

Grows in open heath on yellow or light brown sand, in low open heath on shallow greyish sand over weathered granite or on grey-brown clay over laterite in shrubland. One collection was from a somewhat damp valley flat (E. Griffin, personal communication).

### **Conservation Status**

Current: Priority 1

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Bunney Road	TS	Shire Road Reserve	3.10.1990	Frequent-WH	-
2. W of Bunney Road	TS	-	8.10.1992	Abundant-WH	-
3. Bunney Road	TS	Water Reserve	3.12.1992	Locally abundant	Long unburnt
1.* SW of One Tree Hill	TS	-	2.10.1981	-	-

### **Response to Disturbance**

Unknown

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

Presumed susceptible

### **Management Requirements**

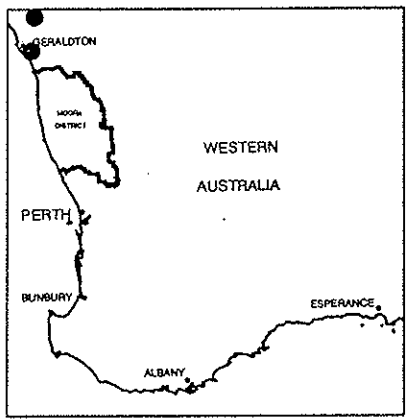
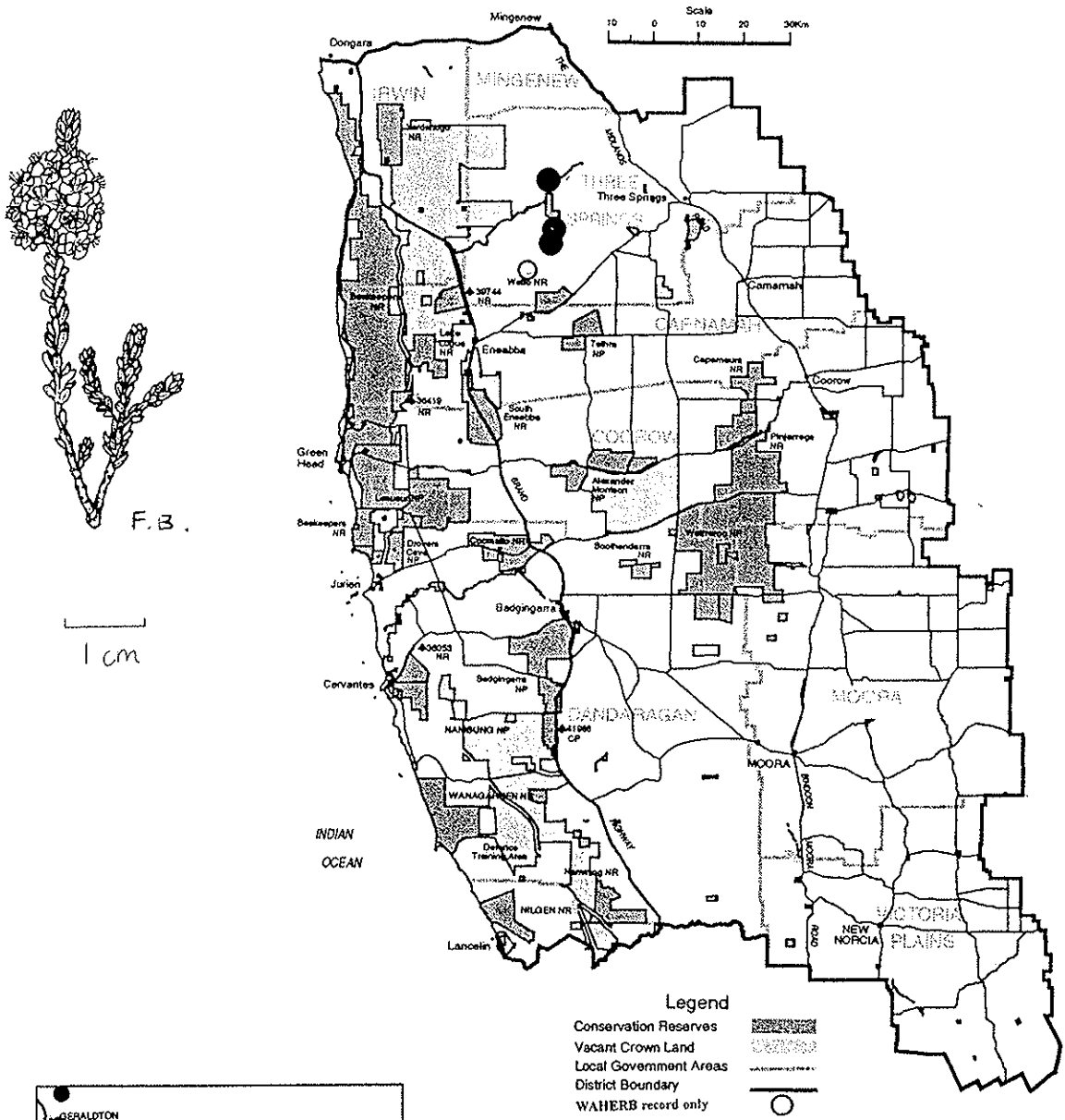
- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that markers are in place at population 1.

### **Research Requirements**

- Further survey is required.

### **References**

Craven (1987a).



Locality Map

● *Homalocalyx chapmanii*

## *Hydrocotyle coorowensis* H.Eichler ms

APIACEAE

A low herb to 5 cm tall, with cordate leaves divided to the middle into three lobes, the upper one with three teeth, the outer ones with four teeth. The flowers are in umbels. Each flower has five minute calyx lobes, five small petals and five stamens opposite the calyx lobes. The fruit is composed of two fruitlets. It is pale brown, with long tubercles and only one fruitlet is winged, the wing much broader than the body of the fruit and with long marginal hairs.

**Flowering Period:** August

**Fruiting Period:** September

### **Distribution and Habitat in the Moora District**

Occurs between Three Springs and Watheroo and is endemic to the Moora District. Few collections have been made and it is possible that the species could occur further east outside the District in similar habitats. It has also been found on several lake beds in the north-east corner of Watheroo National Park where in places it was very common (E. Griffin, personal communication).

Grows on the upper margins of salt lakes associated with *Halosarcia* species and on low winter-wet flats, on white sand and grey clay in herbfields with associated species including *Angianthus tomentosus* and *Puccinellia stricta*.

### **Conservation Status**

Current: Priority 1

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. W of Gunyidi	Co	National Park	14.9.1991	-	-
2.* SE of Three Springs	TS	-	2.9.1987	-	-
3.* SE of Coorow	Co	-	24.10.1983	-	-

### **Response to Disturbance**

Unknown

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

Unknown

### **Management Requirements**

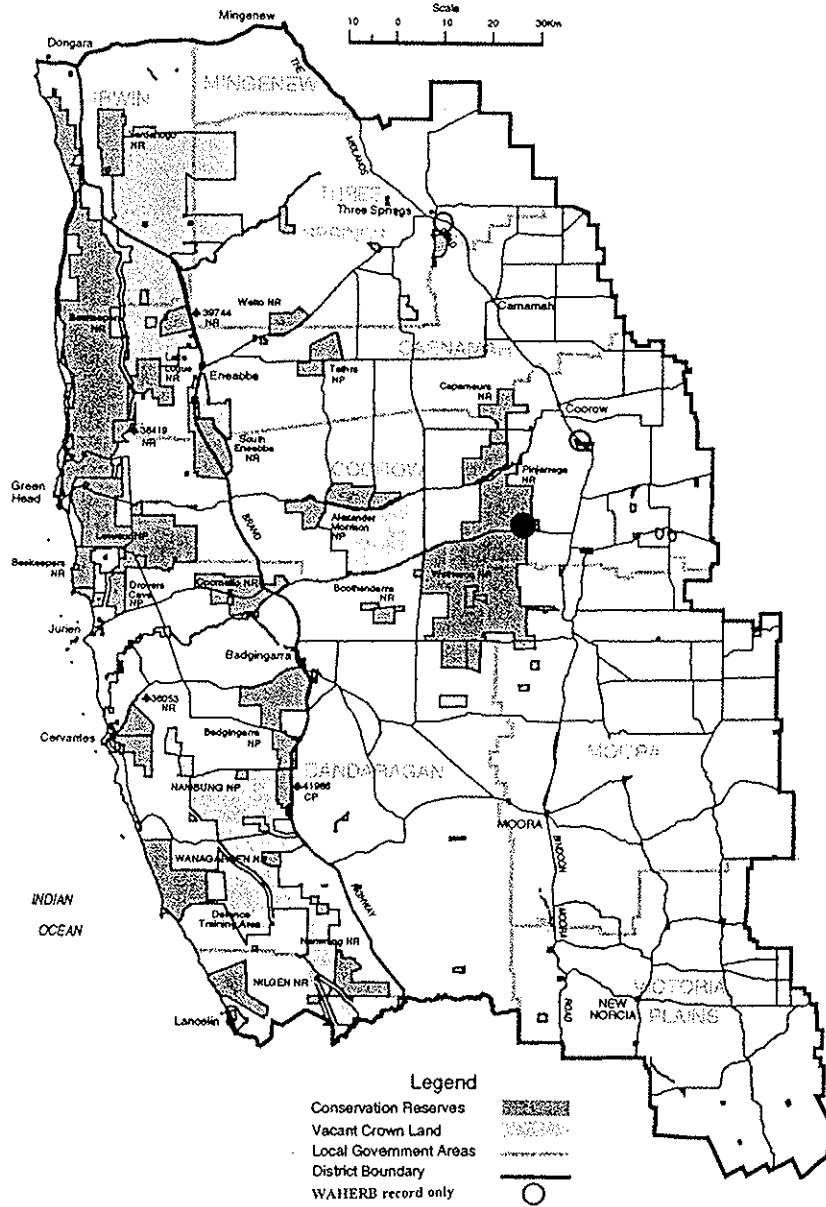
- Ensure that dieback hygiene procedures are carried out at all populations.

### **Research Requirements**

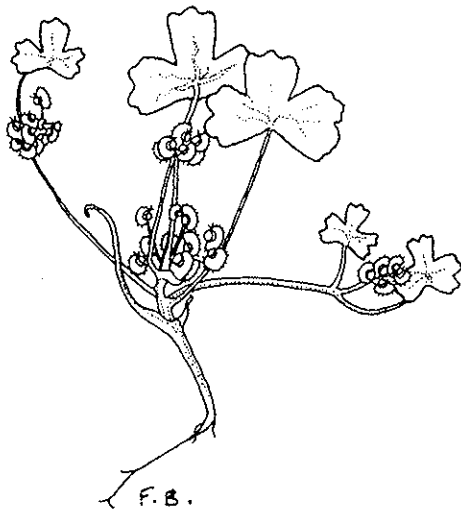
- Further survey is required, particularly to refind known populations in Watheroo National Park and survey fully.

### **References**

B. Rye (personal communication).



● *Hydrocotyle coorowensis* ms



1 cm



2 mm

## *Hypocalymma tenuatum* Strid & Keighery ms

MYRTACEAE

[*Hypocalymma* sp. Lesueur (E.A.Griffin 1972) [aff. *ericifolium*]]

A low shrub to 25 cm tall and 50 cm in diameter. The leaves are opposite, linear, ca. 5 mm long and 0.5 mm wide. The flowers are cream to pale yellow in colour, sessile in pairs at the base of the leaves.

**Flowering Period:** July-October

### **Distribution and Habitat in the Moora District**

Occurs over a range of ca. 6 km to the north and north-east of Mt Lesueur. There is also a report of the species from the Cockleshell Gully area some 10 km further to the north-west. It has been recorded from eight locations, in some of which it was common (E. Griffin, personal communication).

Grows in red brown loam, sandy clay over laterite or grey-brown sand over sandstone in wandoo woodland over low shrubland. It has also been recorded from brown sandy loam or grey-brown sand over sandstone on breakaway slopes in open mallee and *Banksia tricuspis* woodland with associated species in low heath, including *Hakea* species, *Dryandra armata*, *Acacia* sp. It often occurs on the slopes above creeklines.

### **Conservation Status**

Current: Priority 1

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Mt Lesueur	D	National Park	23.9.1992	5+	Undisturbed
2. NNE of Mt Lesueur	D	National Park	6.10.1991	10+	Disturbed
3.* ENE of Mt Lesueur	D	National Park	2.8.1985	-	-

### **Response to Disturbance**

Unknown

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

Presumed susceptible

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

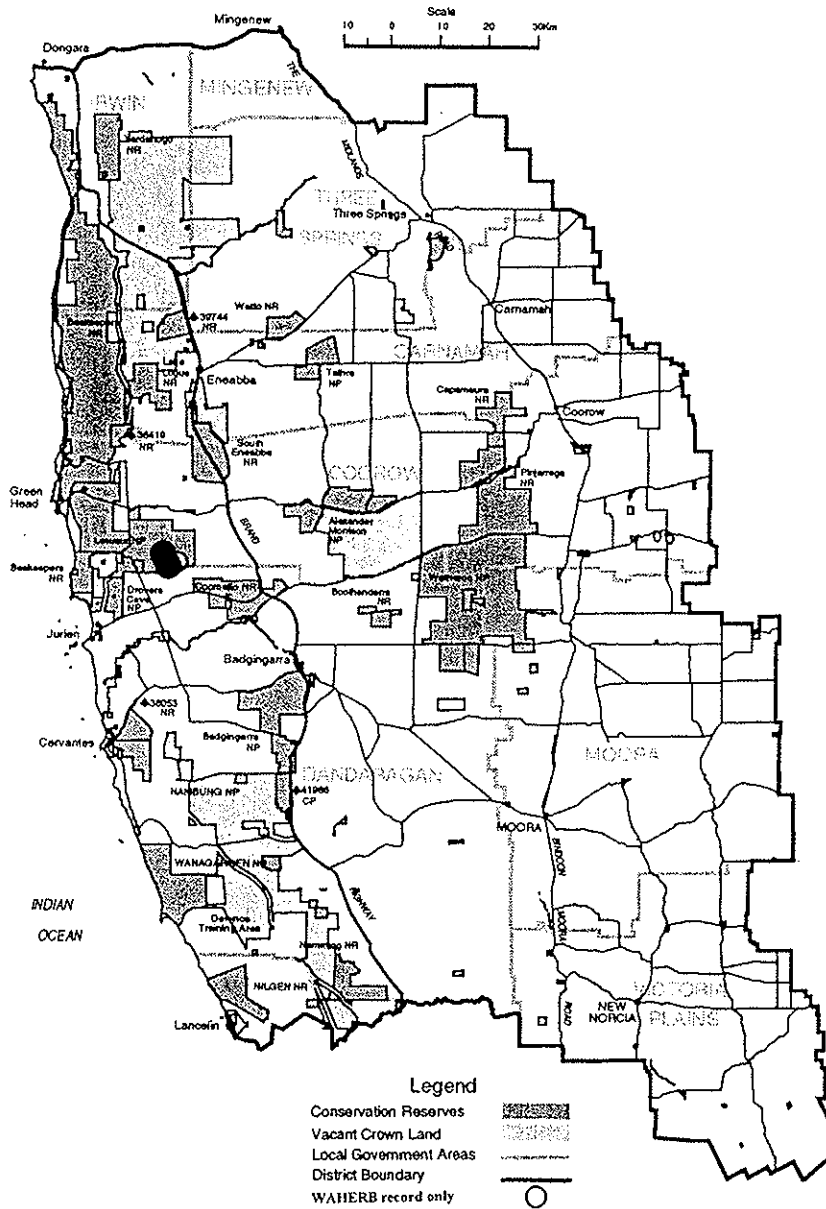
### **Research Requirements**

- Further survey is required to establish the full extent of populations in the known area of occurrence and to confirm the presence of the taxon further to the north-west.

### **References**

G. Keighery (personal communication).





● *Hypocalymma tenuatum* ms



## *Jacksonia pungens* Chappill ms

FABACEAE

[*Jacksonia* sp. Marchagee (B.Barnsley 902) [sp. 21]]

A low, rounded shrub to 80 cm tall. The stems are ridged, terete and densely hairy when young. The leaves are rigid, terete with pungent points and are sometimes forked. The calyx has a dense covering of short hairs and also a layer of long, soft hairs. The flowers are orange in colour.

**Flowering Period:** October-February

### **Distribution and Habitat in the Moora District**

Has been recorded from around Marchagee, over a range of ca. 18 km.

Grows in yellow sand or gravelly lateritic soil with quartzite rocks. It has been recorded from the top of a rise in undulating country, growing in tall heathland with *Allocasuarina campestris*.

### **Conservation Status**

Current: Priority 1<sup>#</sup>

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. S of Marchagee	Co	MRWA Road Reserve	?1994	Frequent	Many plants dead
2.* E of Marchagee	-	-	12.1979	-	-
3.* N of Marchagee	Co	-	12.11.1968	-	-
4.* N of Marchagee	-	-	17.12.1962	-	-

### **Response to Disturbance**

Unknown

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

Presumed susceptible

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

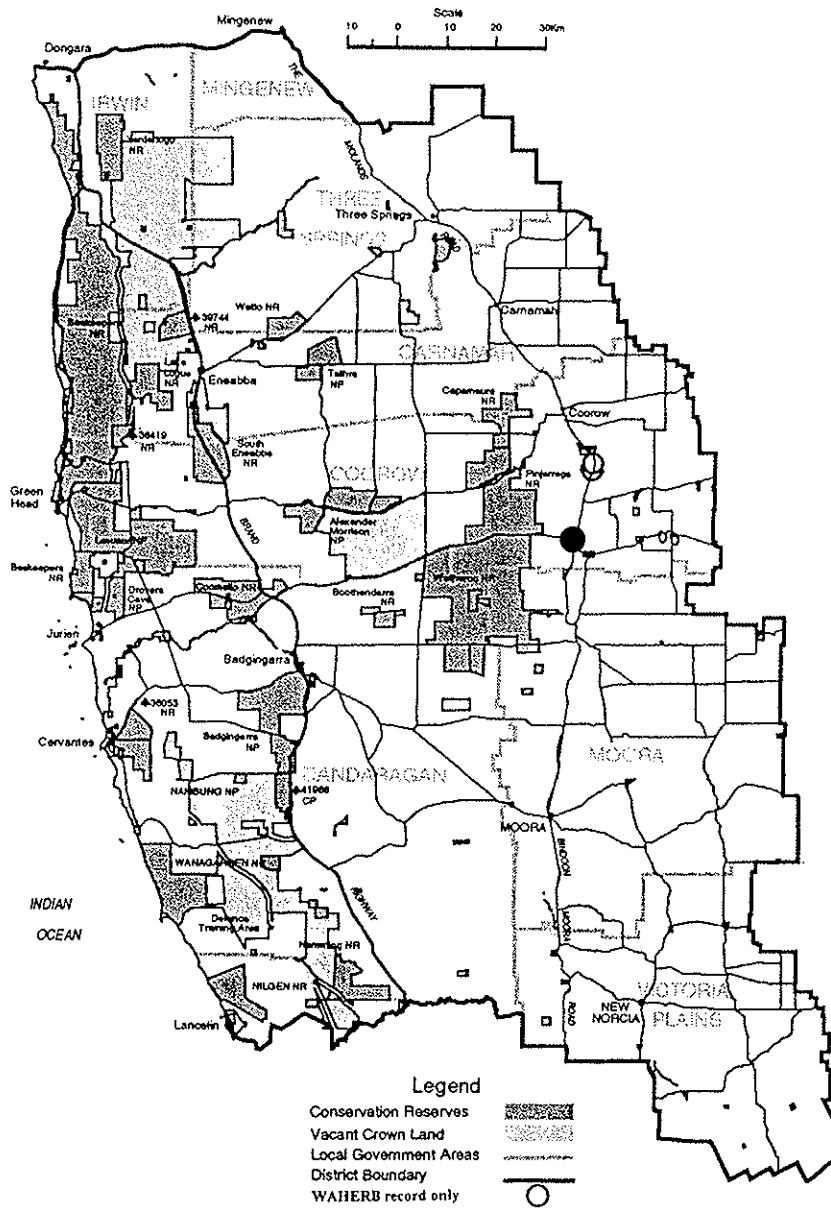
### **Research Requirements**

- Further survey is required to re-find populations of the species.

### **References**

J. Chappill (personal communication).

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



● *Jacksonia pungens* ms

## *Jacksonia* sp. Badgingarra (H.Demarz D6601) [sp. 14]

FABACEAE

A low woody shrub, to 0.3 m tall, sometimes prostrate. It is leafless and the upper stems are usually flexuose, with sharp angles. The flowers are bright red in colour.

This taxon may be synonymous with *Jacksonia rubra* ms, a Priority 2 species which occurs near Tammin.

**Flowering Period:** August-October

### **Distribution and Habitat in the Moora District**

Collections in the Western Australian Herbarium suggest that the taxon occurs over a range of ca. 10 km to the north of Badgingarra and possible further south-east. However, the locality information on all four collections is not very clear.

Has been recorded growing in yellow sand and in wet sand, in dense scrub 20 cm high, and in heath.

### **Conservation Status**

Current: Priority 1

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* Moora-Badgingarra	-	-	23.9.1962	-	-
2.* N of Badgingarra	-	-	15.8.1976	-	-
3.* W of Watheroo	-	-	16.10.1966	-	-
4.* N of Badgingarra	-	-	27.9.1977	-	-

### **Response to Disturbance**

Unknown

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

Presumed susceptible

### **Management Requirements**

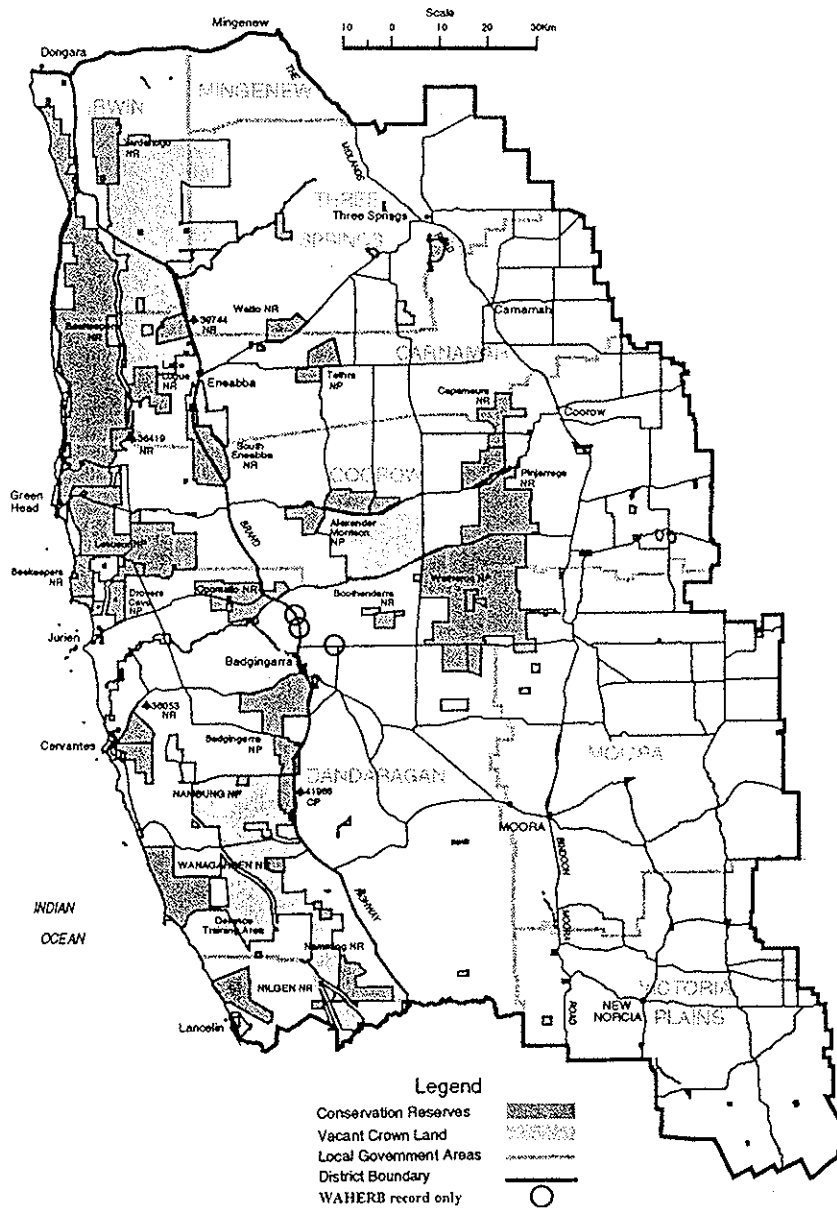
- Ensure that dieback hygiene procedures are carried out at all populations.

### **Research Requirements**

- Further survey is required to re-find populations of this species. It is possible that it may occur near Boothendarra Hill (E. Griffin, personal communication) and should be searched for in that area.
- Further taxonomic study is required to clarify the relationship with *J. rubra* ms.

### **References**

J. Chappill (personal communication).



*Jacksonia* sp. Badgingarra (H.Demarz D6601) [sp. 14]

This species was described by Mueller from collections made between the Greenough and Irwin Rivers. It is an erect shrub 0.5 m to 2.6 m tall with alternate leaves which are entire, narrow, almost glabrous on the upper surface, with a dense covering of whitish to rusty stellate hairs on the lower surface. They are to 6 cm long and 1 cm broad. The inflorescence is a loosely-branched raceme, the pedicels 4 mm long. There are narrow, thread-like bracteoles at the base of each flower stalk. The calyx is thin in texture and hairless on the inside, to 1 cm in diameter, divided more than half way into five acute lobes. It is pink in colour, densely hairy on the outside, appearing white owing to the white stellate hairs, and the edges of the lobes are rusty in colour, particularly in bud. The petals are small, hairless and purple in colour. The stamens are purple, the filaments much shorter than the anthers. The ovary is hairy, the style hairless.

**Flowering Period:** July-September

#### **Distribution and Habitat in the Moora District**

Has been collected from an area west of Three Springs in the north of the Moora District.

Grows in deep grey, white or yellow sand with *Eucalyptus todtiana* in low closed heath or in open heath and scrub.

The species requires further survey particularly in conservation reserves and uncleared remnant vegetation in the Carnamah to Dongara area. It is known only from five collections made this century, apart from the Type collection, and there is little habitat information. The location south-west of Three Springs was searched during this survey but the species was not refound. Natural vegetation at this location is now restricted to road reserves.

#### **Conservation Status**

Current: Priority 1

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SE of Mt Adams	TS	VCL	25.10.1993	Frequent-WH	-
1.* WNW of Arrino	TS	-	22.7.1980	-	-
2.* SW of Three Springs	TS	-	30.9.1966	-	-
3.* W of Three Springs	-	-	9.1940	-	-
4.* Three Springs	TS	-	24.9.1940	-	-

#### **Response to Disturbance**

Unknown

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

Unknown, but thought to be high.

#### **Management Requirements**

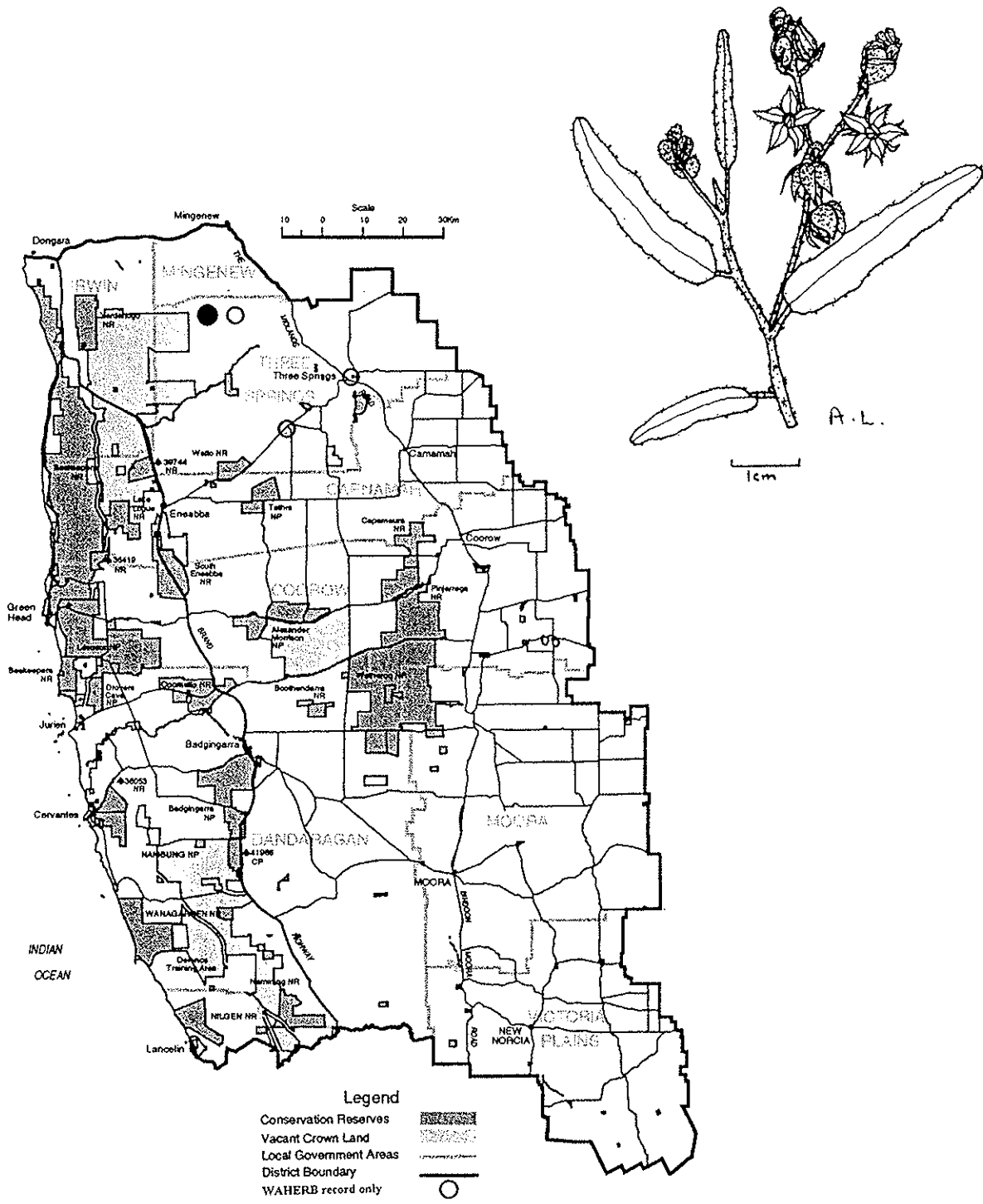
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

**Research Requirements**

- Further survey is required.

**References**

Blackall and Grieve (1985), Paust (ca. 1973), Mueller (1878-1881).



● *Lasiopetalum ogilvieanum*

## *Lasiopetalum* sp. Hill River (T.N.Stoate s.n.)

STERCULIACEAE

A spreading shrub 30 to 60 cm tall with leaves which are orbicular to ovate in shape, deeply cordate, with scattered stiff stellate hairs on both surfaces, otherwise glabrous. They are 1-3 cm broad. The flowers are in loose, branched inflorescences to ca. 4 cm long. The bracteoles are broad, ovate, purple-pink in colour and there is one on each pedicel, distant from the calyx. The calyx is ca. 6 mm long, deeply divided more than half way into five narrow acute lobes. It is greyish-pink in colour, darkening to purple at the base of the inner surface. Both surfaces have a covering of short pale hairs, restricted to the lobes on the inner surface. There is a less dense layer of longer hairs on the outside. The stamens are broad, purple in colour. The style has reflexed, stellate hairs.

Appears to be closely related to *Lasiopetalum membranaceum* which has ovate leaves and occurs in the Dwellingup to Capel area.

**Flowering Period:** August-October

### **Distribution and Habitat in the Moora District**

Populations are known from Badgingarra to Dandaragan. There are two earlier collections, one from "Hill River" and the other from Three Springs.

Grows in low heath, and mallee heath on lateritic uplands, slopes and breakaways in brown loam and lateritic gravel or grey sand and gravel.

### **Conservation Status**

Current: Priority 1

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Marchagee Track	-	-	5.12.1992	-	Long unburnt
2. NE of Badgingarra	D	Nature Reserve	8.10.1991	5+	Undisturbed
3. NE of Badgingarra	D	Nature Reserve	25.9.1988	-	-
4. Mt Misery	D	Private	25.9.1991	50+	Undisturbed
5.* Three Springs	TS	-	26.8.1940	-	-
6.* Hill River	-	-	10.1952	-	-

### **Response to Disturbance**

Unknown

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

Unknown, but thought to be high.

### **Management Requirements**

- Ensure that populations 2 and 3 are included in management plans.
- Maintain liaison with landowner (population 4).
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

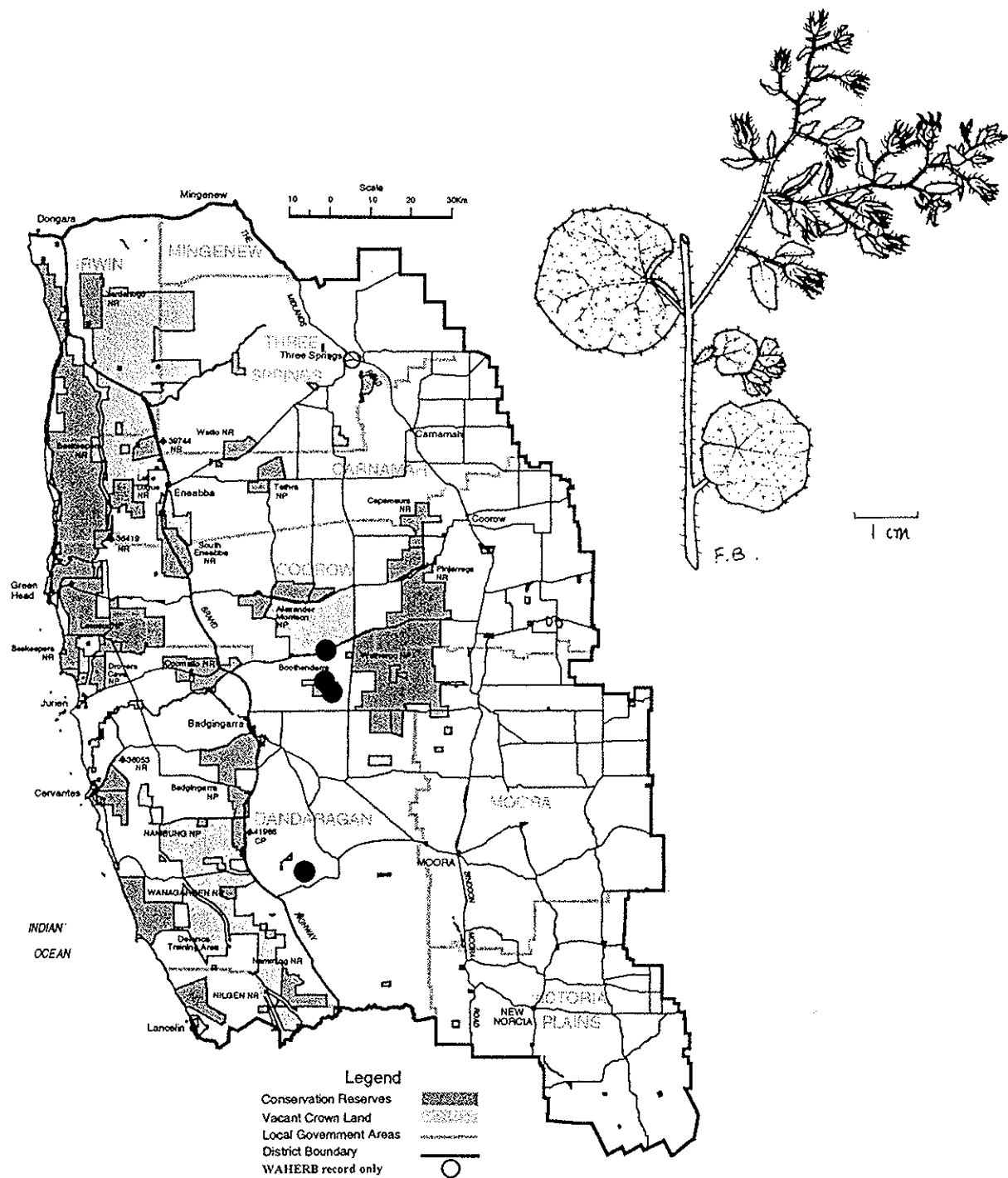


## Research Requirements

- Further survey is required particularly to survey population 3 fully.

## References

Paust (ca. 1973).



● *Lasiopetalum* sp. Hill River (T.N.Stoate s.n.)

## *Lechenaultia juncea* E.Pritz.

## GOODENIACEAE

Reed-like Lechenaultia

This species was described in 1905 from specimens collected by Pritzel in 1901 from between the Moore and Murchison Rivers.

It is an erect plant to 50 cm tall, with reed-like hairless stems, almost leafless and with few branches. They are smooth on the upper parts, with rough pale bark only at the base of the plant. The leaves are few, scattered on the lower flowering stems and crowded on the short leafy stems. They are narrow, hairless and fleshy, 8.5-16 mm long. The flowers are in loose, few-flowered inflorescences. The sepals are 5-6 mm long and are all the same length. The flowers are pale blue, 14-18 mm long, with the upper two corolla lobes free and spreading, with very narrow wings if present. The corolla tube is hairy on the inside and is open on one side to the base. The style is 7.5-8.5 mm long, glandular hairy, and the indusium is hairy on the back.

**Flowering Period:** Late October-December

### Distribution and Habitat in the Moora District

Occurs from south-west of Carnamah south to the Watheroo area. It is not conspicuous and flowers in summer so may be under-recorded. It has been recorded from north-east of the Watheroo National Park (Carger Road and from the Marchagee Track (E. Griffin, personal communication.).

Grows in yellow or white sand or sandy gravel in heath and low scrub. Associated species include *Actinostrobilus arenarius* and *Banksia prionotes*.

### Conservation Status

Current: Priority 1

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. W of Warro Farm	D	National Park	17.11.1988	10 est.	Growing on a chained area, firebreak after a burn
2. N of Watheroo	Mo	Railway Reserve	14.11.1990	100+	Undisturbed
3. W of Gunyidi	Co	MRWA Road Reserve	14.11.1990	30+	Disturbed and weed infested
4. Brand Mudge Road	Ca	Shire Road Reserve, Private	15.11.1990	50+	Undisturbed
5. Carnamah-Eneabba Road	Ca	MRWA Road Reserve, Private	15.11.1990	1000+	Partly disturbed by firebreak
6. Carnamah-Eneabba Road	Ca	MRWA Road Reserve	15.11.1990	200+	Disturbed
7. Carnamah-Eneabba Road	Ca	MRWA Road Reserve	15.11.1990	50+	Undisturbed
8. Masons Road	Mo	-	27.10.1992	Occasional plants	-
9.* Coorow	Co	-	9.1940	-	-

## Response to Disturbance

Some populations occur on disturbed road edges, a collection made in 1961 was from regrowth in a ploughed field, and population 1 was growing on a chained area.

Appears to be more common after fire (E. Griffin, personal communication).

## Susceptibility to *Phytophthora Dieback*

Unknown

## Management Requirements

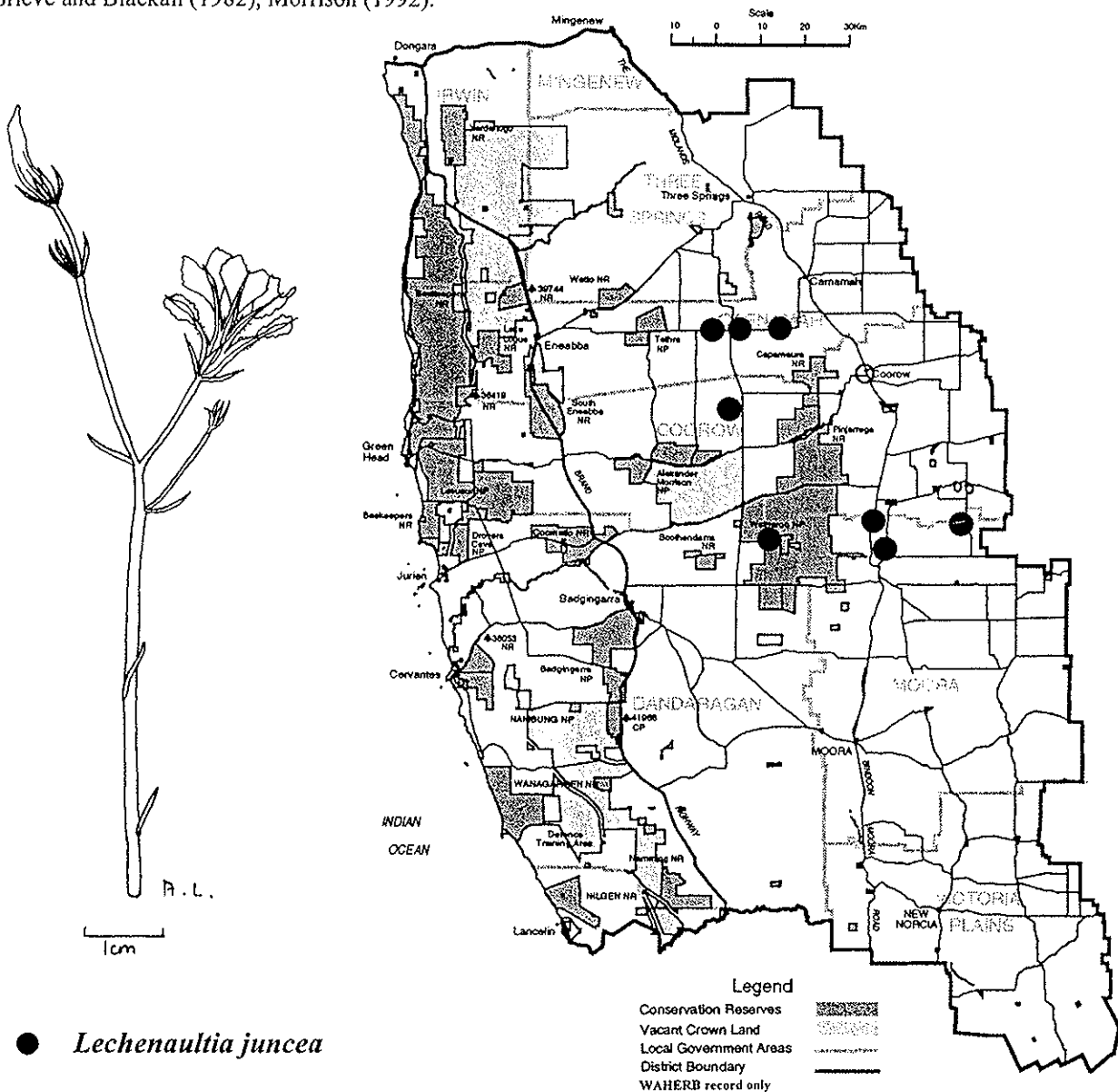
- Ensure that all road reserve populations are marked.
- Maintain liaison with land managers.
- Ensure that dieback hygiene procedures are carried out at all populations.

## Research Requirements

- Further survey is required, particularly to survey population 1 fully and to find further populations on conservation areas.

## References

Grieve and Blackall (1982), Morrison (1992).



## *Leucopogon plumuliflorus* F.Muell.

EPACRIDACEAE

A weak upright shrub 30-60 cm tall, the stems and leaves with stiff, spreading hairs. The leaves are ovate-cordate, with a blunt point, convex with recurved margins, ca. 1 cm long. The flowers are in head-like terminal spikes which are white to pale pink in appearance. The sepals have very long plumose points and are ca. 5 mm long giving the inflorescence a feathery appearance. The corolla is ca. 3 mm long, the lobes shorter than the tube. The ovary is 2-celled and the style is very short.

**Flowering Period:** August-October, February-April

### **Distribution and Habitat in the Moora District**

This species is restricted to the Lesueur area where it occurs over a narrow range of about 8 km, but has been recorded from over 200 sites in that area (E. Griffin, personal communication).

Grows in shallow grey sand and lateritic gravel or in cream sandy clay in open low heath on breakaway slopes. Associated species include *Hakea neurophylla*, *Xanthorrhoea drummondii* and *Gompholobium* sp.

### **Conservation Status**

Current: Priority 1

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Mt Lesueur	D	National Park	6.10.1991	100+	Undisturbed
2. NE of Mt Lesueur	D	National Park	17.4.1993	Frequent-WH	Undisturbed
3. NE of Mt Lesueur	D	National Park	21.9.1988	-	-
4.* NW of Mt Lesueur	D	National Park	27.8.1979	-	-
5.* Cockleshell Gully	D	National Park	10.11.1979	-	-
6.* Mt Lesueur	D	National Park	11.7.1982	Locally frequent-WH	-

### **Response to Disturbance**

Population 1 was growing in an area which had been burnt several years previously. Sprouts after fire (E. Griffin, personal communication).

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

Presumed susceptible

### **Management Requirements**

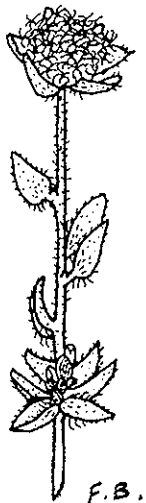
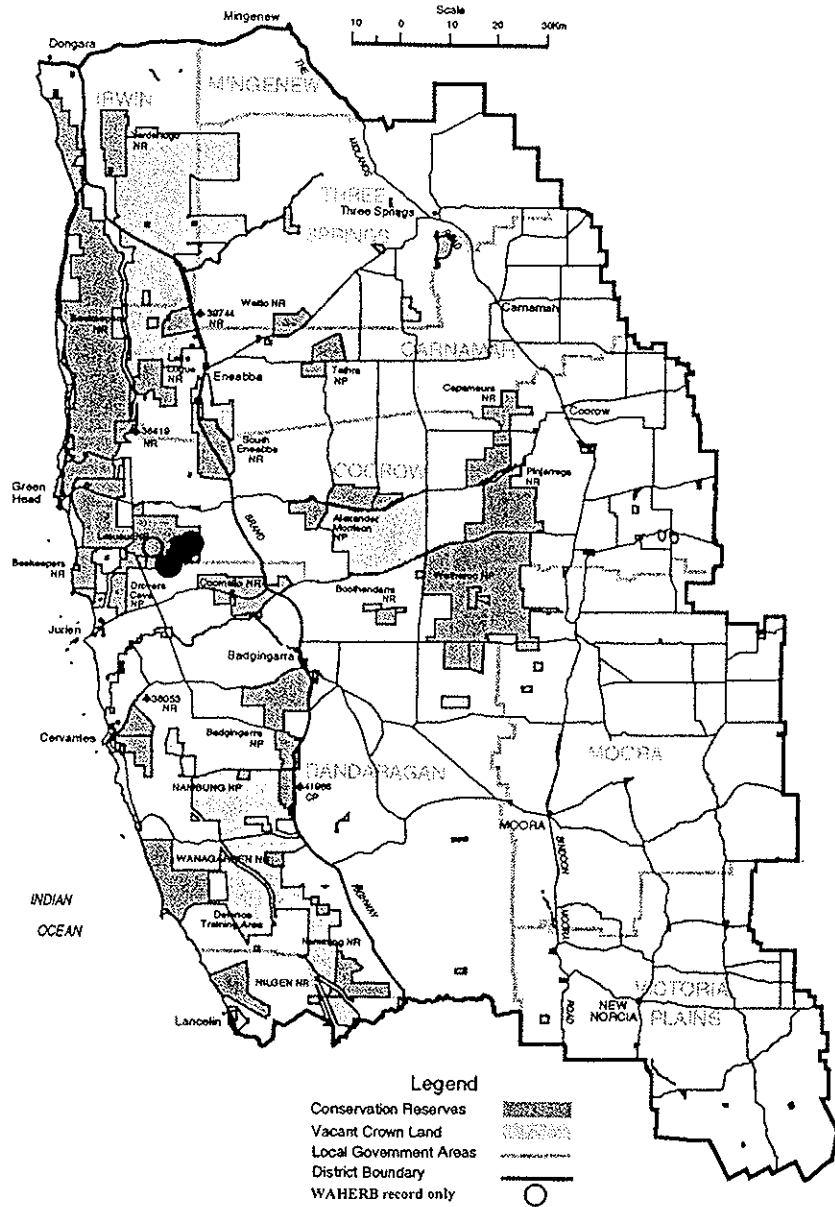
- Ensure that dieback hygiene procedures are carried out at all populations.

### **Research Requirements**

- Further survey is required to establish the full extent of populations in the area of occurrence and to refine and survey populations 2-6.

### **References**

Bentham (1869), Blackall and Grieve (1981), Mueller (1867).



1 cm

● *Leucopogon plumuliflorus*

## *Macarthuria* sp. Mullering (B.J.Keighery 517)

MOLLUGINACEAE

An erect subshrub to 40 cm tall, with hairy, bright to yellowish-green stems. The leaves are present mainly at the base of the stems and on young growth. They are narrowly obovate to elliptic in shape, 2.7-11.5 mm long, 0.7-3.5 mm broad. The flowers are in condensed cymes of up to 25 flowers which are terminal or in the axils of the upper branches. The flowers have five sepals which are hairy on the outside. The outer ones are green, the inner are partly white and membranous. The five petals are narrow, falling early. There are 8 stamens joined at the base. The style is small, divided into three. There is one ovule per cell. The seeds are round, black and shiny.

This species is distinguished by the dense covering of golden hairs on the stems and leaves and the large number of flowers in the inflorescence.

**Flowering Period:** September-December

### **Distribution and Habitat in the Moora District**

Known in the Moora District from one population north-west of Cataby where it occurs on white sand in low woodland of *Banksia menziesii*, *B. attenuata* and *Eucalyptus todtiana* with low heath. It appears to be a disturbance opportunist, being common in this area on the firebreak, but uncommon in adjacent woodland.

The species has also been collected from Kewdale in the Perth area in 1981 and was rediscovered in Forrestfield in the spring of 1995.

### **Conservation Status**

Current: Priority 1<sup>#</sup>

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
I. Wolka Road	D	Shire Road Reserve	11.9.1991	1 in 1991, common in 1990	Growing prolifically on firebreak in 1990, less common in undisturbed woodland

### **Response to Disturbance**

Appears to be a disturbance opportunist, growing in large numbers in disturbed soils.

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

Unknown

### **Management Requirements**

- Ensure that the population is marked.
- Discover status of land adjoining the population and inform landowner or manager.
- Ensure that dieback hygiene procedures are carried out at population.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

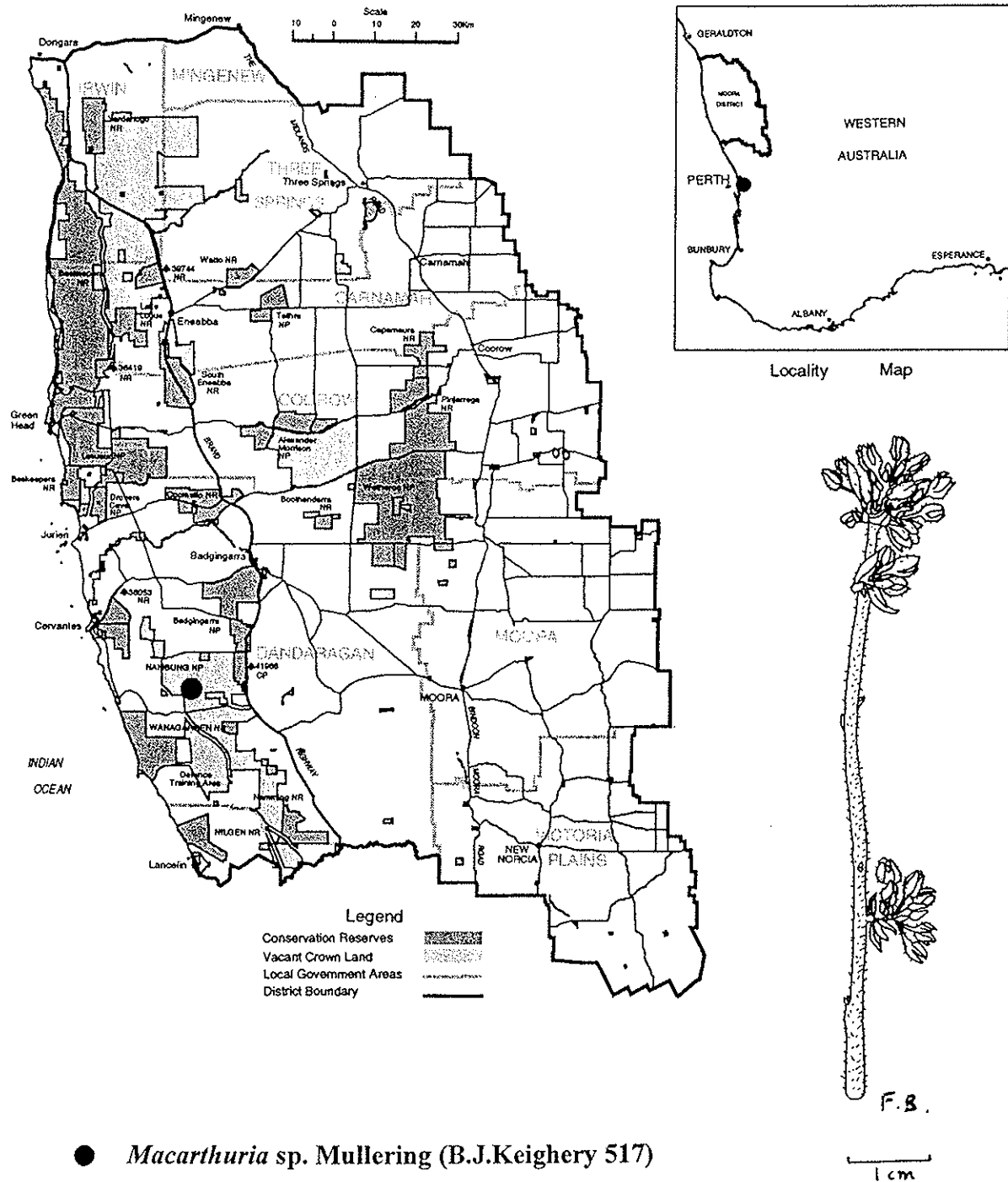
<sup>#</sup> now Declared Rare Flora (updated at December 1999)

## Research Requirements

- Further survey is required.

## References

B. Keighery (personal communication), B. Lepschi (personal communication).



***Malleostemon* sp. Cooljarloo (B.Backhouse s.n. 16.11.88)**

MYRTACEAE

A low, erect shrub to 40 cm tall and 40 cm wide, with spreading upper branches. The leaves are linear, 3-10 mm long, ca. 0.5 mm wide. They are opposite on the main stems or crowded on short leafy shoots. The flowers occur singly in the axils of the upper leaves. Each has five short, blunt calyx lobes and five pink petals.

**Flowering Period:** November-December

**Distribution and Habitat in the Moora District**

Two populations have been found recently 19 km apart on the south-west side of the Moora District. It grows on pale grey sand over gravel and brown sandy clay in low, winter wet areas with low scrub, low heath and dwarf scrub. Associated species include *Banksia telmatiaea*, *Astartea fascicularis* and *Verticordia densiflora*.

**Conservation Status**

Current: Priority 1

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* NW of Cataby	D	?VCL	21.10.1990	-	-
2.* E. of Lake Guraga	D	Shire Road Reserve	1.12.1992	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

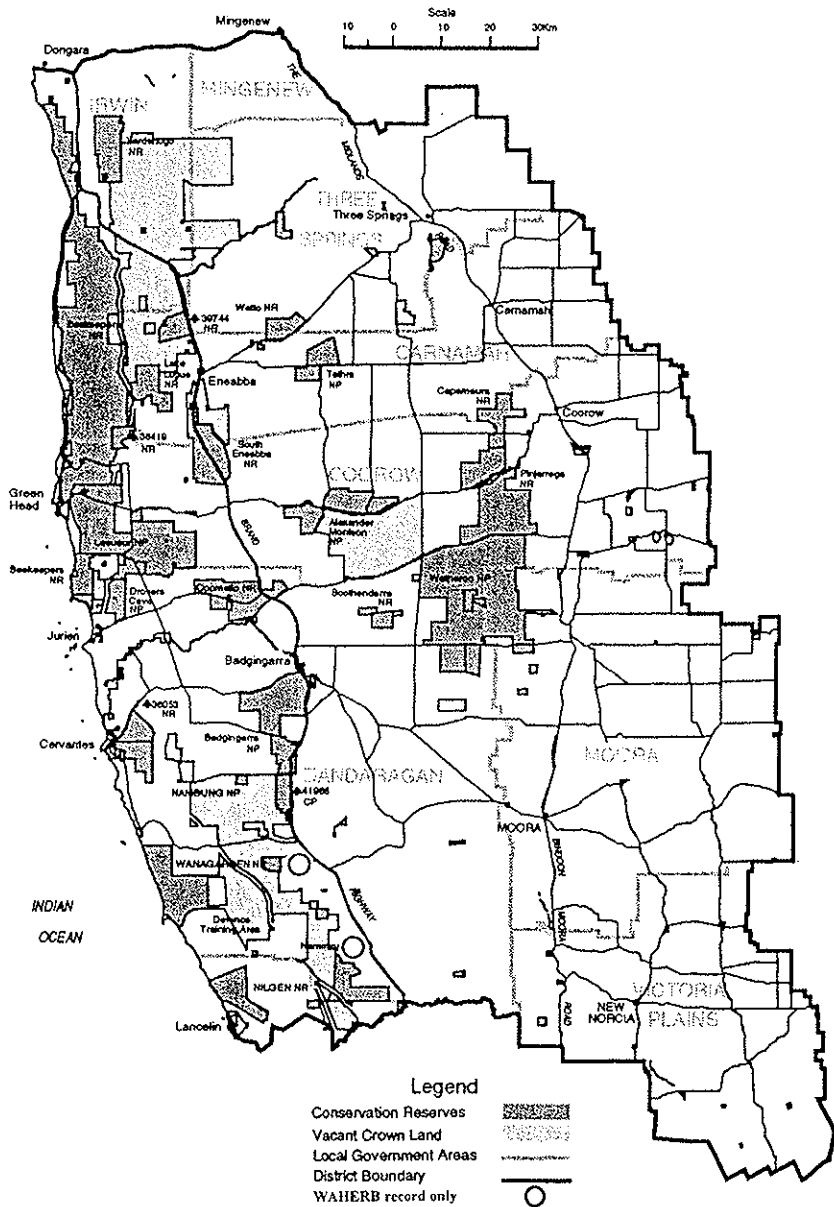
**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required to refind both populations and conduct full surveys.
- Further taxonomic work is required to clarify the taxonomic status of the taxon.





1 cm

*Malleostemon* sp. Cooljarloo (B.Backhouse s.n. 16.11.88)

## *Myriocephalus suffruticosus* Benth.

ASTERACEAE

Shrubby Myriocephalus

This species was first collected by James Drummond from between the Moore and Murchison Rivers and was described by Bentham from these collections in 1866.

*Myriocephalus suffruticosus* is a subshrub to 80 cm tall, with a stout woody base and the branches with a white, cottony tomentum. The leaves are linear, to 2 cm long, half stem clasping, with revolute margins. The flower heads are hemispherical and up to 2 cm in diameter, with all the florets tubular and bisexual and with an involucre of numerous petal-like bracts in several rows, the bracts white, broad and conspicuous. The achenes are glabrous and the pappus is made up of several fine bristles with glandular heads.

**Flowering Period:** November, December and April

### **Distribution and Habitat in the Moora District**

This species is known from only six collections made between Badgingarra and Dandaragan. Two populations which have been recorded recently are on adjacent private properties and at least one population is fenced (E. Griffin, personal communication).

Has been recorded growing in wandoo woodland in gravelly loam and clay on upper slopes.

### **Conservation Status**

Current: Priority 1

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SE of Badgingarra	D	Private	7.11.1988	-	-
2. SE of Badgingarra	D	Private	28.9.1988	Many	Excellent
1.* Badgingarra	D	-	26.11.1974	-	-
2.* Dandaragan	D	-	26.11.1974	-	-

### **Response to Disturbance**

Unknown

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

Unknown

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

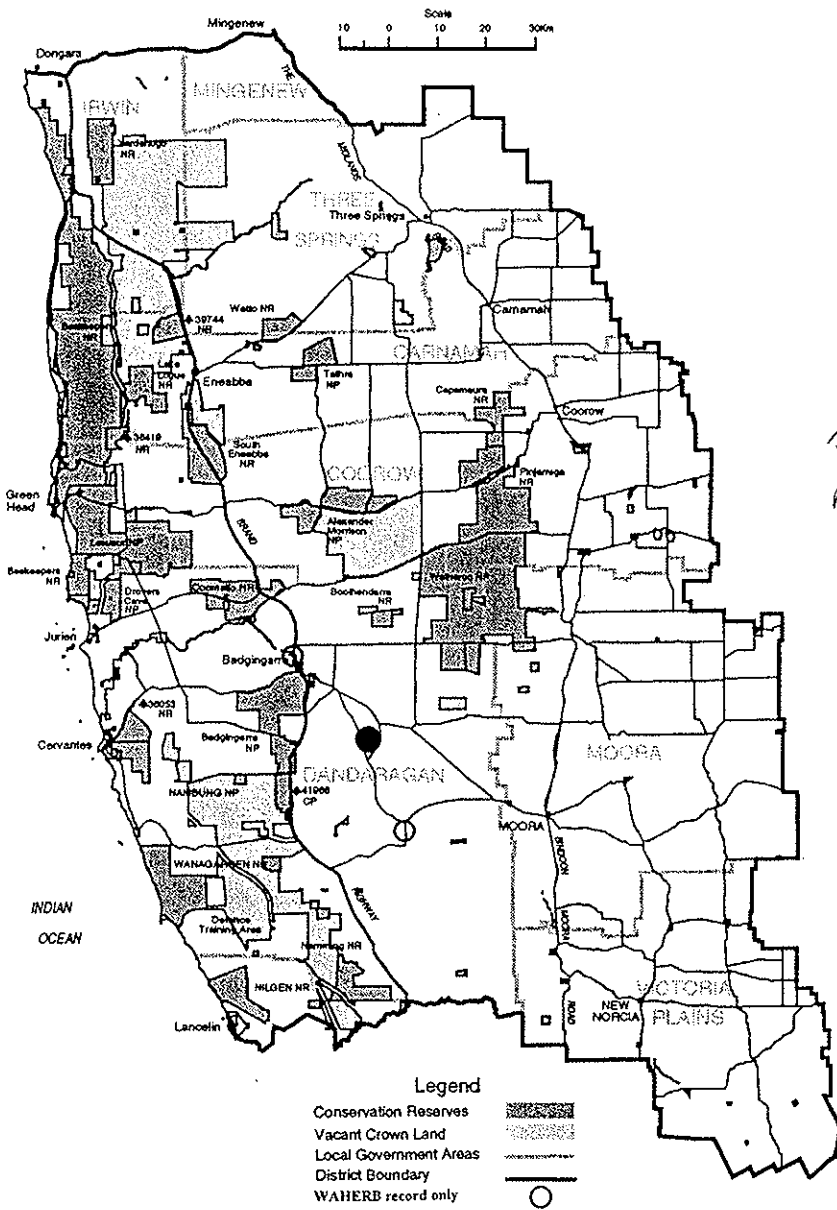
### **Research Requirements**

- Further survey is required.

References

Bentham (1866), Grieve and Blackall (1982).

● *Myriocephalus suffruticosus*



*Phlebocarya pilosissima* (F.Muell.) Benth.  
subsp. *teretifolia* T.D.Macfarl.

HAEMODORACEAE

A loosely tufted perennial herb with short rhizomes, to 25 cm tall and 50 cm diameter. The stem has long internodes, exposed between the partially overlapping bases of the old leaves. The leaves are terete and hairless or sometimes with fringing hairs in the upper 1-2 cm. They are 0.6-0.9 mm in diameter. The sheaths are always hairy in the upper part, sometimes also to the base. The flowers are in a cymosely branched panicle. Each flower has 3 sepals and 3 petals of the same size. They are white, whitish-green to pale yellow in colour. There are 6 stamens with filaments inserted at the base of the perianth and the ovary is inferior. The style is divided into three at the top, with three stigmas. The fruit is one seeded.

Differs from *Phlebocarya pilosissima* subsp. *pilosissima* in the terete, not flattened leaves which are mostly hairless.

**Flowering Period:** August-October

#### **Distribution and Habitat in the Moora District**

Occurs in the Lesueur area with one record from west of Badgingarra.

Grows in deep white sand, lateritic or grey sand in low shrubland or low mixed heath with scattered *Eucalyptus todtiana*, *Banksia menziesii* and *B. attenuata* on slopes, below breakaways and in shallow valleys.

#### **Conservation Status**

Current: Priority 1

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* NW of Mt Lesueur	D	National Park	3.8.1979	-	-
2.* SSW of Mt Peron	D	National Park	17.10.1981	Common-WH	-
3.* Cadda Road	D	-	17.8.1975	-	-
4.* Cockleshell Gully Road	D	-	21.9.1982	-	-

#### **Response to Disturbance**

Unknown

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

Unknown

#### **Management Requirements**

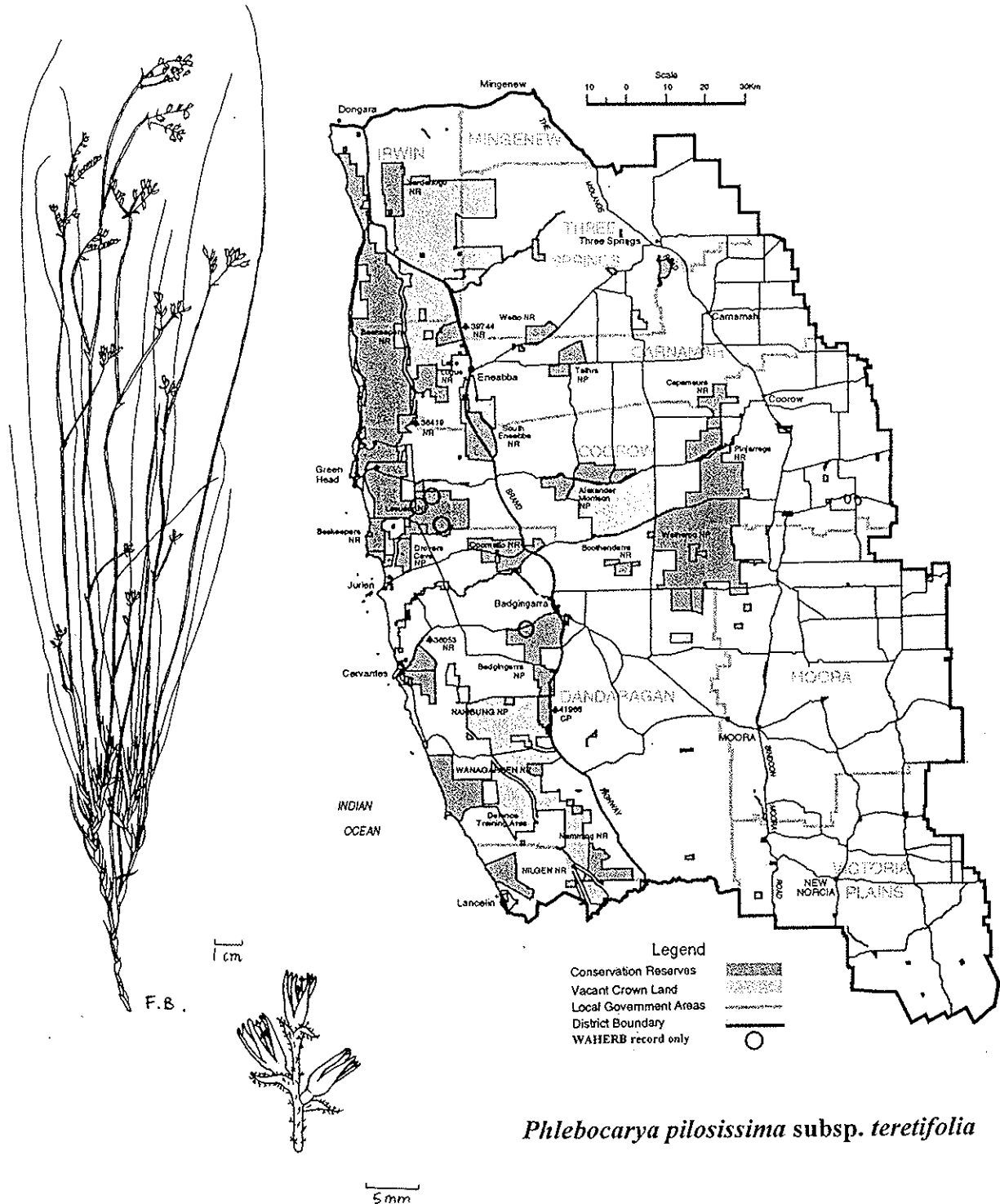
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

## Research Requirements

- This taxon was not found during this survey and there are no herbarium records more recent than 1982. Most of the recorded populations are in the Lesueur National Park and therefore are unlikely to have been destroyed but further survey is required to establish the status of the species, particularly in the Lesueur and Badgingarra National Parks.

## References

Macfarlane (1987).



*Phlebocarya pilosissima* subsp. *teretifolia*

This species was described by Fitzgerald from specimens which he collected in 1903 from the Arrino sandplains.

*Pityrodia viscida* is an erect, branched shrub to 1 m tall. The stems are almost hairless and viscid, or with short, viscid hairs. The leaves are sessile, opposite and oblong-obovate to narrow-elliptic, with an obtuse tip, 7-13 mm long, 3-5 mm broad. The upper leaf surface is hairless, viscid and olive green, the lower surface is covered with yellowish-white hairs. The flowers are solitary in the upper leaf axils. The pedicels, lower bract surfaces and calyx outer surface are all covered with a viscid pubescence. The corolla is 9-12 mm long, with a tube which is gradually dilated and 4-5 mm long. It is divided into a two-lipped upper lobe and three-lipped lower lobe and is white in colour. There are four stamens in two pairs, the lower pair longer than the upper, the anthers with appendages on the lower end. The ovary is covered with short hairs and the style is slender and hairless, scarcely longer than the corolla tube.

*P. viscida* is closely related to *P. glutinosa*, which has hairless stems, leaves and outer calyx surfaces. It is also similar to *P. hemigenioides*, which has a cottony white tomentum on stems, leaves and calyx and a corolla tube abruptly dilated from the calyx.

**Flowering Period:** August-November

#### Distribution and Habitat in the Moora District

Populations of this species are known from the northern boundary of the Moora District west of Yandanooka, around Three Springs and south-west to south of Eneabba. An early collection was made by Diels in 1901 from Mingenew further north in the Geraldton District and has recently been refound in that area.

Grows in grey or white sand, or yellow-brown sandy loam with laterite, in heath, low scrub and open low woodland on slopes, hilltops and flat areas.

#### Conservation Status

Current: Priority 1

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. NW of Eneabba	TS	Shire Road Reserve	3.10.1991	700	Disturbed
2. N of Tathra	TS	Shire Road Reserve	3.10.1991	206	Disturbed
3. SW of Yandanooka	TS	Shire Road Reserve	25.9.1990	46	Disturbed
4. NNW of Mt Muggawa	Mi	Shire Road Reserve	25.9.1990	99	Disturbed
5. E of Tathra	Ca	Shire Road Reserve	3.10.1990	58	Disturbed
6. W of Three Springs	TS	Shire Road Reserve	3.10.1990	680	Disturbed
7. NW of Eneabba	TS	Shire Road Reserve	3.10.1990	18	Disturbed
8. E of Tathra	Ca	Shire Road Reserve	4.10.1990	1000	Disturbed
9. E of Tathra	Ca	Road Reserve	5.11.1992	10 est.	Disturbed
10. Yandanooka West Road	?M	Shire Road Reserve	18.8.1993	10+	Undisturbed
11. S of Eneabba	Co	MRWA Road Reserve	6.11.1992	20+	Partly disturbed
12. NW of Three Springs	TS	Shire Road Reserve	18.8.1993	10+	Undisturbed
13. Yandanooka West Road	?M	Shire Road Reserve	18.8.1993	1000+	Healthy
14. NW of Three Springs	TS	Shire Road Reserve, Railway Reserve	18.8.1993	1000+	Undisturbed
1.* W of Yandanooka	Mi	-	31.10.1974	-	-
2.* Mingenew	Mi	-	12.9.1901	-	-

## Response to Disturbance

Appears to favour disturbance, as all populations have been found on road verges and tracks in soil disturbed by grading.

## Susceptibility to *Phytophthora* Dieback

Unknown

## Management Requirements

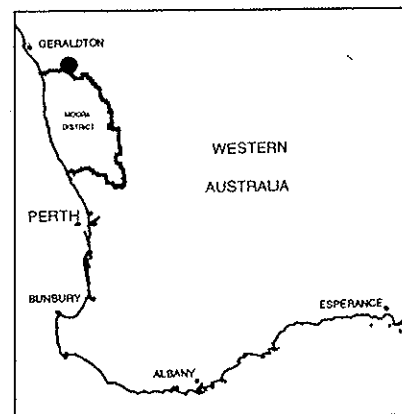
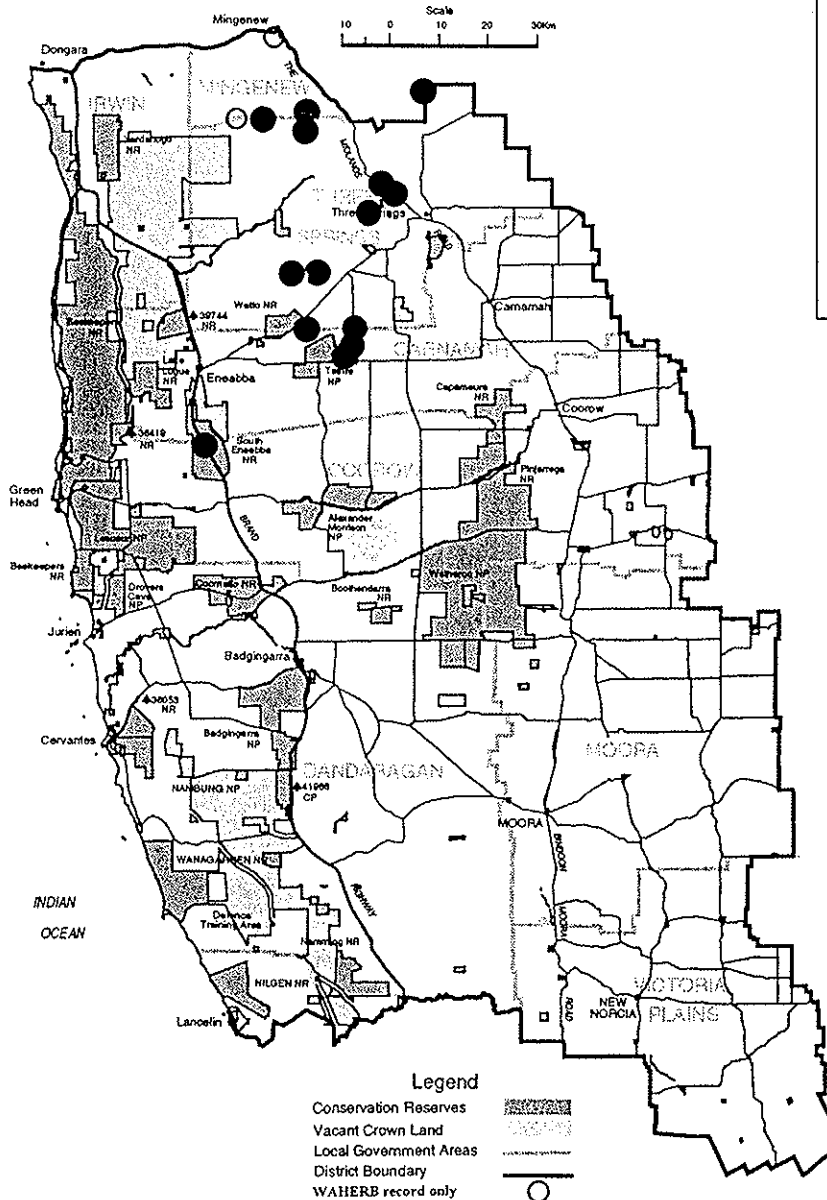
- Ensure that dieback hygiene procedures are carried out at all populations.

## Research Requirements

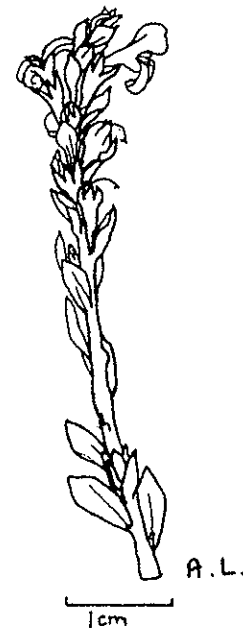
- Further survey is required on conservation reserves.

## References

Fitzgerald (1904), Munir (1979).



Locality Map



● *Pityrodia viscida*

*Ptilotus caespitosus* F.Muell.

AMARANTHACEAE

Salt Lake Mulla-Mulla

This species was described by F. Mueller in 1868 from material collected by James Drummond. Bentham included it as *Trichinium caespitosum* in 1870. The species was presumed extinct until recollected in 1987 from private land near Coorow.

*Ptilotus caespitosus* is a low, densely tufted perennial plant, with short crowded branches covered with the overlapping persistent remains of the dead leaves. The leaves are crowded on the short non-flowering branches, linear-terete in shape, with a mucronate tip, to 6 mm long. The floral leaves are scattered on the flowering stems, which are up to about 14 cm tall. The flower spikes are hemispherical to conical in shape, 1-2 cm in diameter. The bracts and bracteoles are nearly glabrous, broad, with the midrib produced to a short point. They are thin and shining, ca. 4 mm long, closely enveloping the perianth. The perianth tube is short, slightly longer than the bracts, densely hairy on the outside. There are two perfect stamens with very short filaments and a short style.

**Flowering Period:** October-November

**Distribution and Habitat in the Moora District**

The species is now known from two populations ca. 40 km apart on the north-east side of the Moora District north-east of Carnamah and south-east of Coorow.

It grows on margins of salt lakes on grey to white clayey sand or white sand in low open scrub with mat plants and herbs. Associated species include *Halosarcia*, *Atriplex*, *Rhagodia*, *Frankenia*, *Melaleuca* and *Acacia* species.

**Conservation Status**

Current: Priority 1

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1a. SE of Coorow	Co	Private	16.10.1991	70	Partly disturbed, fenced
1b. SE of Coorow	Co	Private	16.10.1991	240	Partly disturbed, fenced
2. NE of Carnamah	Ca	Shire Road Reserve, Private	4.11.1992	8	Partly disturbed

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

- Ensure that roadside markers are in place at population 1.
- Maintain liaison with landowners and Shire.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

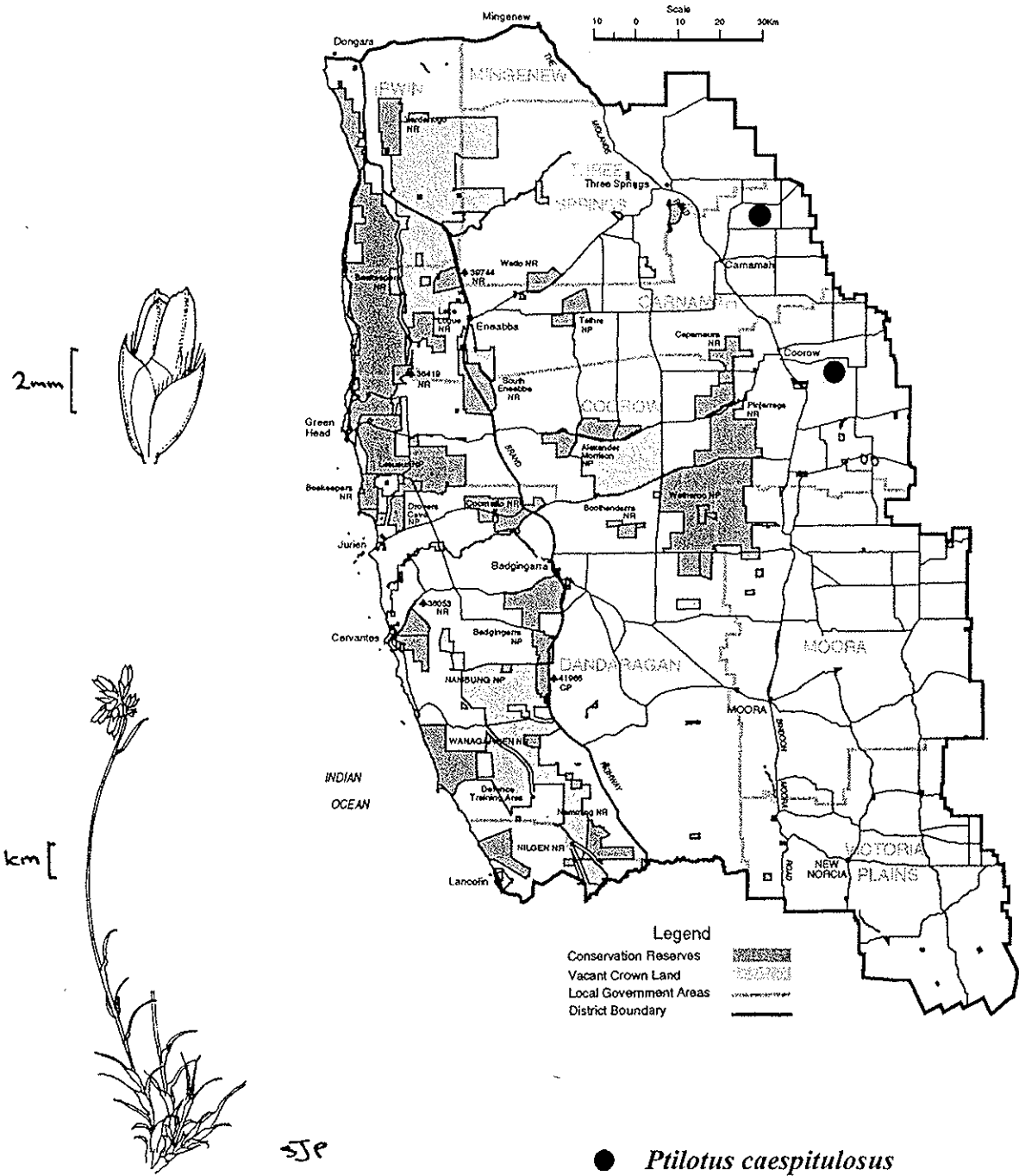


## Research Requirements

— Further survey is required.

## References

Benl (1972), Bentham (1870), Mueller (1868).



***Restio stenandra*** L.A.S.Johnson & B.G.Briggs ms

RESTIONACEAE

[*Restio* sp. (B.Briggs 7473)]

This is an undescribed species which has also been referred to as *Restio* sp. 2 (Briggs and Leigh 1988). It was first collected in 1979 and is known from few collections.

*R. stenandra* ms is a low perennial herb with creeping rhizomes which forms large clumps. It grows to ca. 90 cm tall.

**Flowering Period:** September-November

**Distribution and Habitat in the Moora District**

Appears to be restricted to the Lesueur area where it has been collected from a narrow range of less than 10 km.

Grows in deep yellow sand of small watercourses, with lateritic gravel, adjacent to heath with species of *Hakea*, *Lambertia*, *Xanthorrhoea* and *Allocasuarina*.

**Conservation Status**

Current: Priority 1

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* SE of Mt Lesueur	D	National Park	29.9.1984	Locally abundant-WH	-
2.* NE of Mt Lesueur	D	National Park	17.11.1979	-	-
3.* ENE of Mt Lesueur	D	National Park	21.9.1979	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

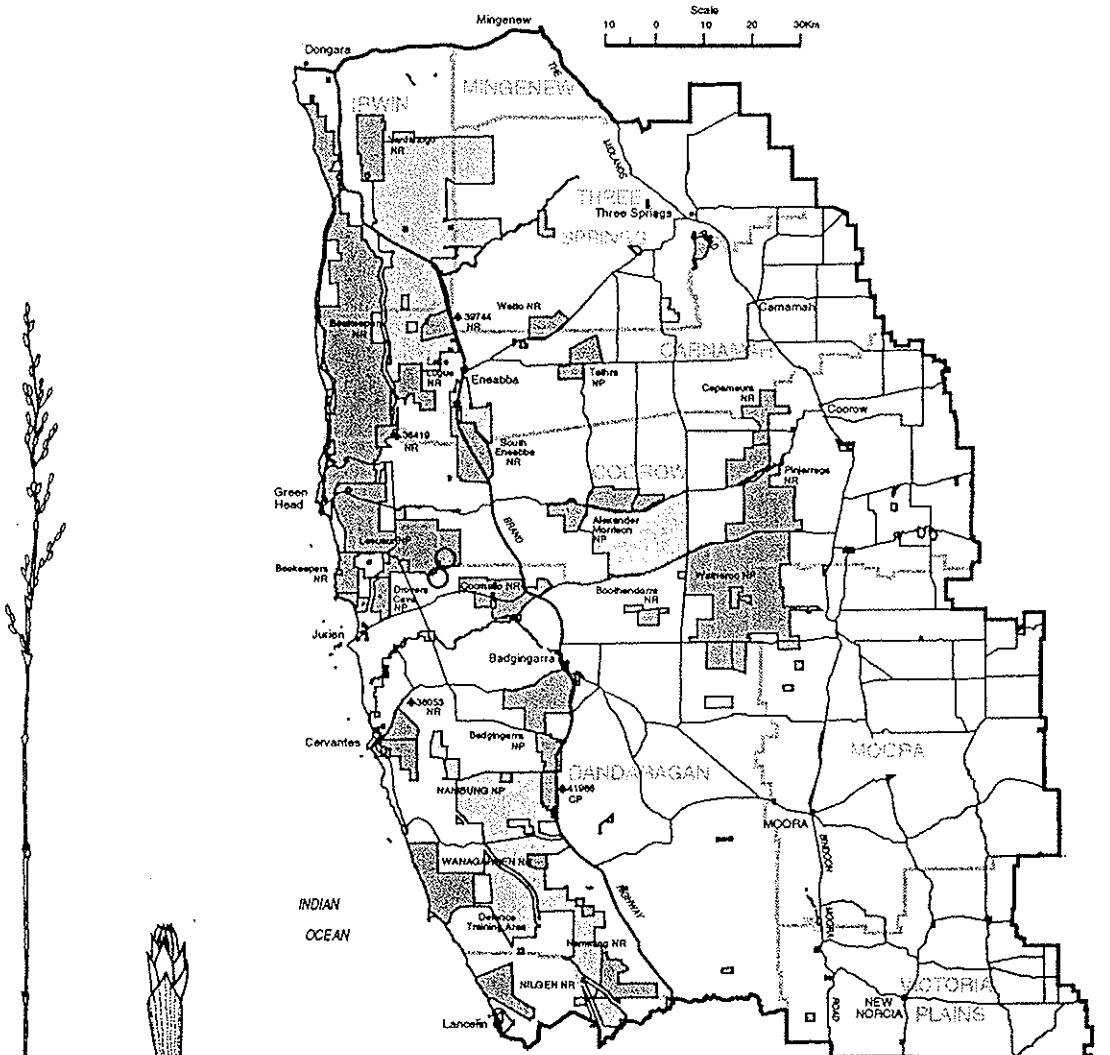
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required particularly to re-find and survey fully, the known populations.

**References**

Briggs and Leigh (1988).



**Legend**  
 Conservation Reserves  
 Vacant Crown Land  
 Local Government Areas  
 District Boundary  
 WAHERB record only



F.B.

5 cm ♂



5 mm ♀



5 mm ♀

*Restio stenandra ms*

*Rumex drummondii* was collected by Drummond from "Swan River" between 1837 and 1852, and by Oldfield at Kalgan River near Albany in the mid 1800s. A third collection was made at Gingin in 1938. There is also a collection made from between Kalannie and Kulja (in the Merredin District) in 1948 and another possibly from this area at Burekup (possibly Burakin) made in 1924. The species was presumed extinct until 1991 when a population was rediscovered at Regans Ford during the course of research on the biological control of weeds related to *R. drummondii*. Subsequent survey work resulted in the discovery of eleven more populations in the Kalgan River to Manypeaks area, two of which are on a nature reserve.

*R. drummondii* is an erect, terrestrial, perennial plant 60-90 cm tall with the stems branched in the upper half forming an open panicle. The basal leaves have stalks equalling the lamina in length. They are oblong-lanceolate in shape with a truncate base, to 10 cm long and 2 cm broad, whilst the upper stem leaves have shorter stalks and are narrower and more acute. The flowers are in distant whorls of 8-12 flowers. The fruits are on pedicels two or three times as long as the valve. The valves of the fruit are oblong, tongue-shaped with a prolonged apex which is recurved but not hooked. They are up to 4.5 mm long, 1.5-2 mm broad, with 2-3 straight to arcuate teeth on either side, the upper one pointing forward. The central nerve of the valve has a callosity near the base.

**Fruiting Period:** Fruiting from mid October with mature fruits in November in the Moora District. Fruiting elsewhere between October and January.

#### Distribution and Habitat in the Moora District

One population has been found in the Moora District on the southern boundary at Regans Ford.

The species occurs in winter-wet depressions, usually in open areas where there has been soil disturbance and in positions where the plant would be submerged for part of the year. It was found associated with *R. crispus* and other *Rumex* species in all populations and growing on clayey loam soil at Regans Ford in open low woodland of *Eucalyptus rudis* with a ground flora of introduced grasses and *Watsonia* sp. Populations from further east may occur in a different habitat to those from further west and south. It is possible that this species is introduced from eastern Australia as is also the case with the other two native species, *R. brownii* and *R. dumosus* (Rechinger 1984). This may explain the widely separated localities in which the species has been found and its association with disturbed areas.

The species is now known from a total of twelve populations of ca. 350 mature plants. Two populations with 60+ plants are located on a nature reserve, the others on road verges or private land. The population at Regans Ford is located on a shire reserve and two of the populations in the Albany District with a total of 60+ plants are on a nature reserve. All other populations occur on road verges or private land.

#### Conservation Status

Current: Priority 1

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Regans Ford	G	?Shire Reserve	18.11.1992	2	Population in dense stand of <i>Watsonia</i> sp.

#### Response to Disturbance

May be favoured by soil disturbance, several populations occurring in disturbed areas.

Occurs in dense stand of *Watsonia* sp. at Regans Ford and the population appeared to be declining. Other populations occur amongst introduced grasses and seem to be able to withstand some weed invasion.

Appears to be very susceptible to grazing.

Usually occurs in open areas, but some populations are within open woodland.

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at population.

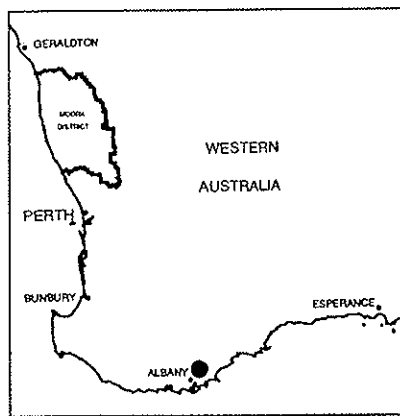
**Research Requirements**

- Further survey is required, particularly in suitable habitat on conservation areas in the areas of known occurrence and in the Regans Ford to Gingin area and Kalannie to Kulja area where the species has not been found recently.

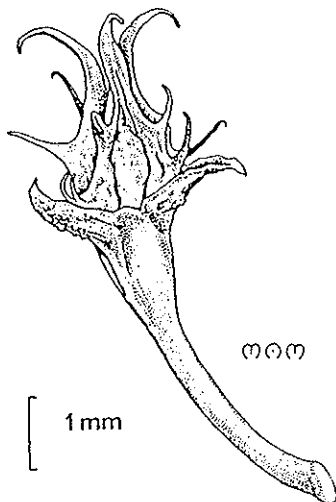
**References**

Rechinger (1984), Scott and Yeoh (1995).

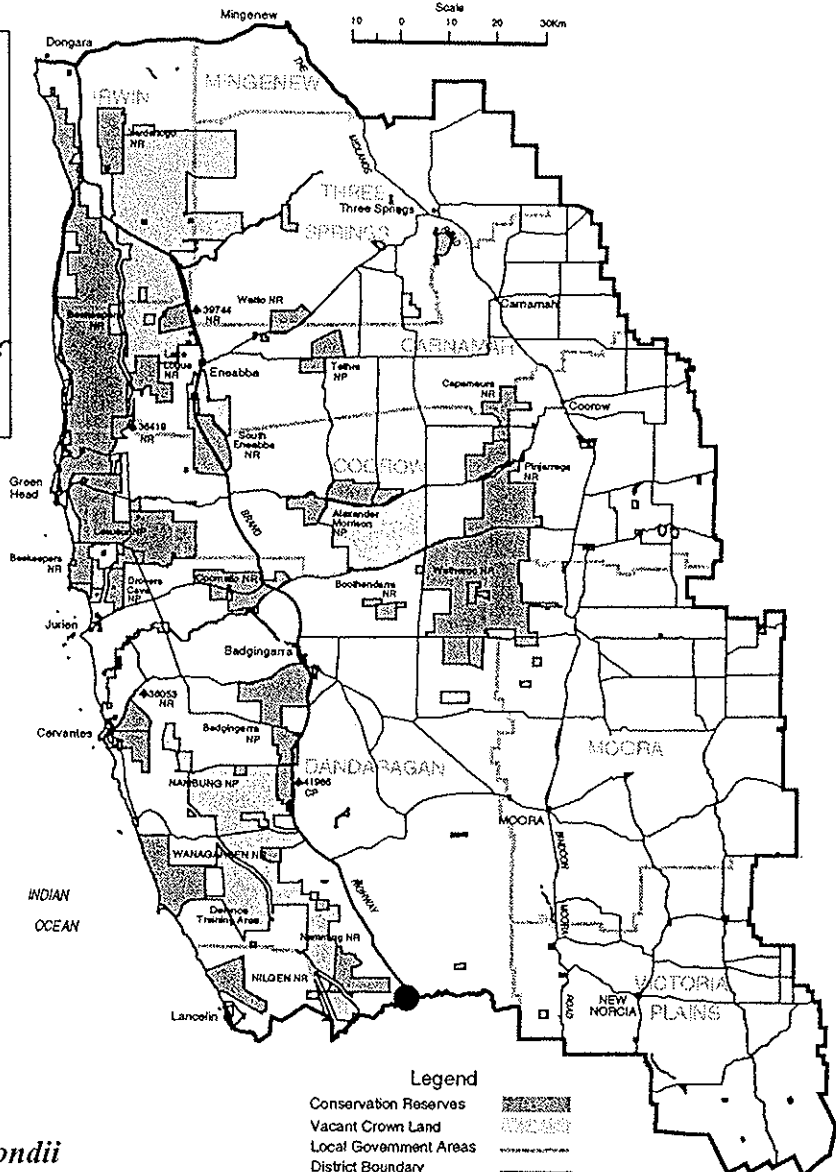
Illustration by Margaret Menadue



Locality Map



● *Rumex drummondii*



This species was described by Carolin in 1990 from a collection made in 1964. At that time this was the only collection of the species known. Subsequently another specimen has been identified as *Scaevola eneabba*. This was collected in February 1968 by Demarz and provides information on the flower colour, habit and habitat of the species.

*S. eneabba* is an erect, shrubby plant with bristly hairs, and is loose and spreading in habit. It grows to about 60 cm tall. The leaves are sessile, linear to oblanceolate, entire and thick, up to 30 mm long and 2 mm wide. The flowers are in terminal spikes to 25 mm long, with lanceolate bracts to 8 mm long, with long marginal bristles. The sepals are 1 mm long, broadly triangular and joined at the base. The corolla is ca. 9 mm long, with hairs on the outside which are long, stiff and brownish-yellow towards the top. There are short hairs on the inside on the lobes and throat. The corolla is white to pink in colour and is divided into five flat, winged lobes. The tube is split open, exposing the indusium and giving the flower a fan shape. There are narrow lobes on the edges of the corolla lobes known as barbulae which have papillae at the apex. The ovary is densely covered with long white hairs and has two locules. The fruit is not known.

**Flowering Period:** December and February

#### **Distribution and Habitat in the Moora District**

The species has been recorded from two localities, both of which are imprecisely recorded. However, they are both in the Eneabba area.

Has been recorded only as growing in sand heath.

Although several likely areas for the previous collections of this species have been searched, it has not been refound.

#### **Conservation Status**

Current: Priority 1

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* Turn-off to Greenhead from Eneabba	Co	-	21.2.1968	-	-
2.* Ca. 65 km from Eneabba	-	-	15.10.1964	-	-

#### **Response to Disturbance**

Unknown

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

Unknown

#### **Management Requirements**

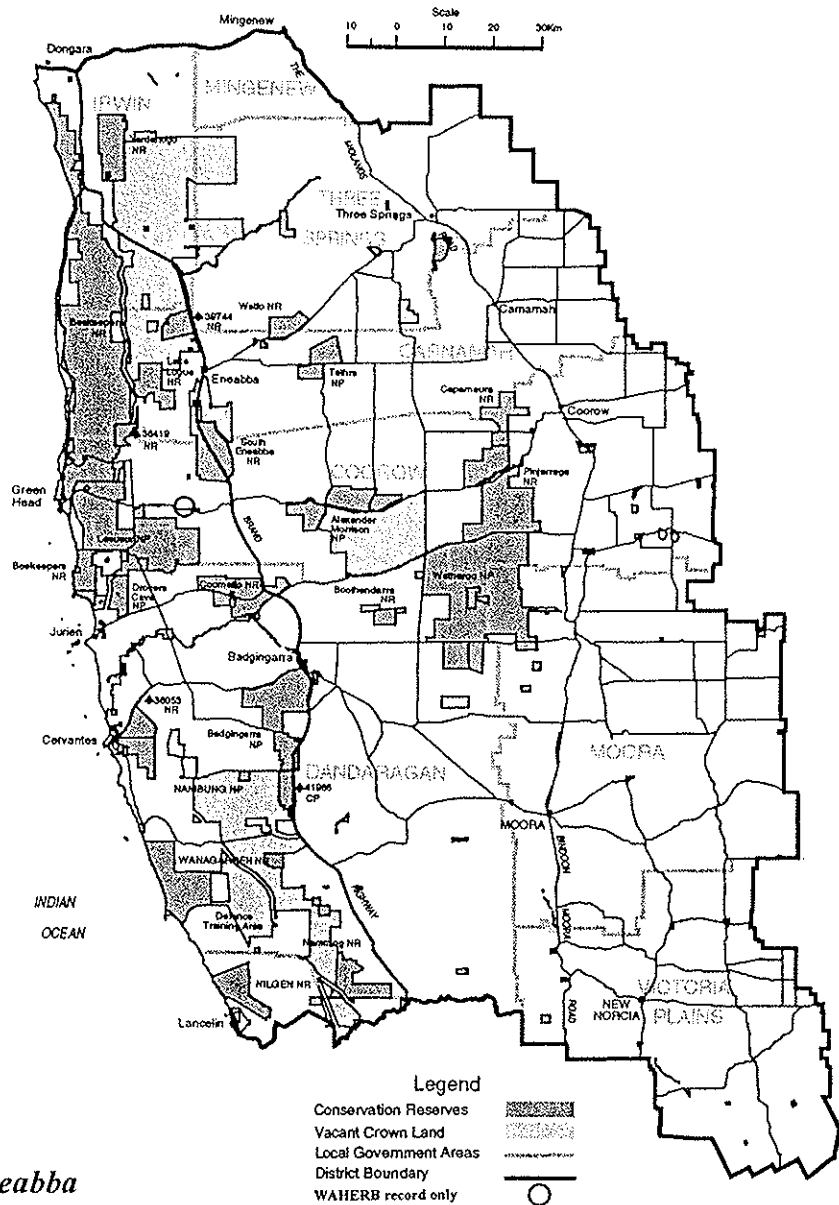
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

## Research Requirements

- Urgently requires further survey, particularly in the Eneabba to Greenhead area.

## References

Carolin (1990b, 1992).



*Scaevola eneabba*

A tufted perennial herb to 35 cm tall, with strongly ribbed, resinous, scabrous stems which are terete, yellow-green, up to 1 mm wide. There are small leaves at the base with shiny, red-black sheaths. The flowers are grouped in a narrow panicle, to 6 cm long. There are one or two pale brown spikelets in each sheathing bract. Each spikelet is slightly resinous, the lower with a short stalk, and two flowers in each. The glumes are ciliate. There are three stamens and the style has three plumose stigmatic lobes. The nut is brown, three-angled and tuberculate.

**Flowering Period:** December-February

#### **Distribution and Habitat in the Moora District**

Occurs from Kenwick in the metropolitan area north to Kalbarri in the Geraldton District. In the Moora District the species has been recorded from west of Eneabba and Carnamah.

It grows in winter wet areas, in grey sand over gravelly loam, or sandy black clay, in dwarf scrub over low heath.

The species was not found during this survey but the late flowering period and inconspicuous habit of the plant may have contributed to this. However the species has been found recently on one nature reserve on the southern boundary of the District and was found in 1979 in another area which has recently been gazetted as a nature reserve where it may still occur. It has also been recorded from the Kalbarri National Park. Further survey is required in the District and also in the Geraldton District before its conservation status can be assessed.

#### **Conservation Status**

Current: Priority 1

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* W of Lake Indoon	Ca	VCL	8.9.1979	Common-WH	-
2. SW of Eneabba	Ca	-	12.1991	-	-
3.* W of Carnamah	-	-	8.2.1954	-	-
4. Mogumber	VP	Nature Reserve	22.11.1996	Uncommon	-

#### **Response to Disturbance**

Unknown

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

Unknown

#### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

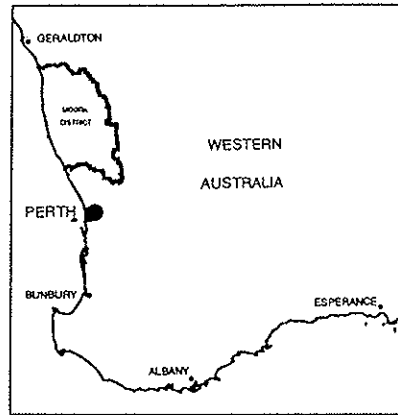
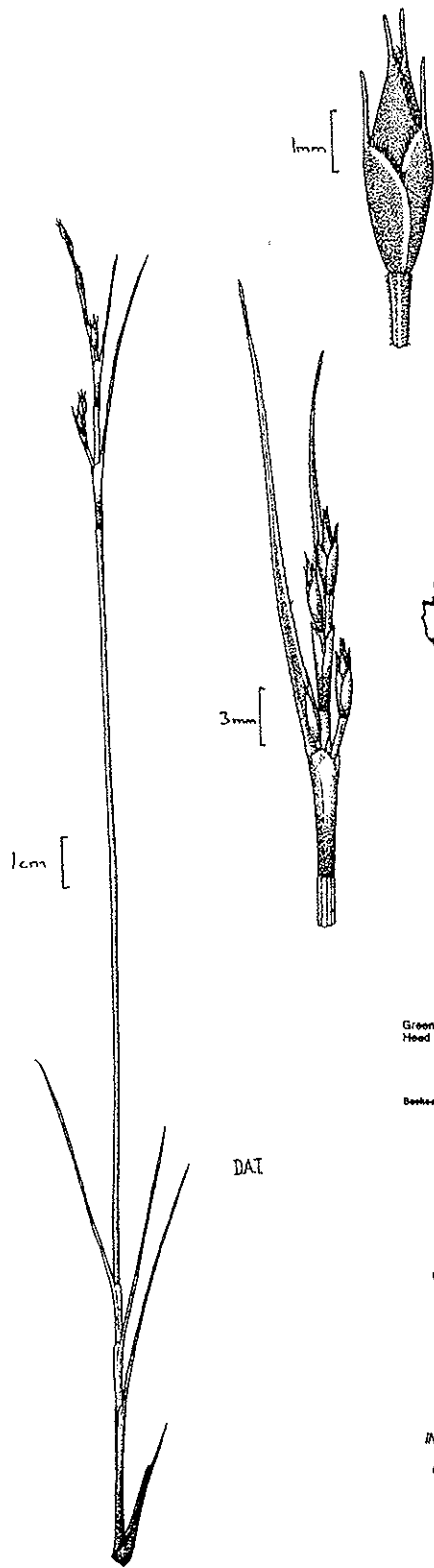
#### **Research Requirements**

- Further survey is required, particularly to re-find populations 1-3 and complete full surveys.

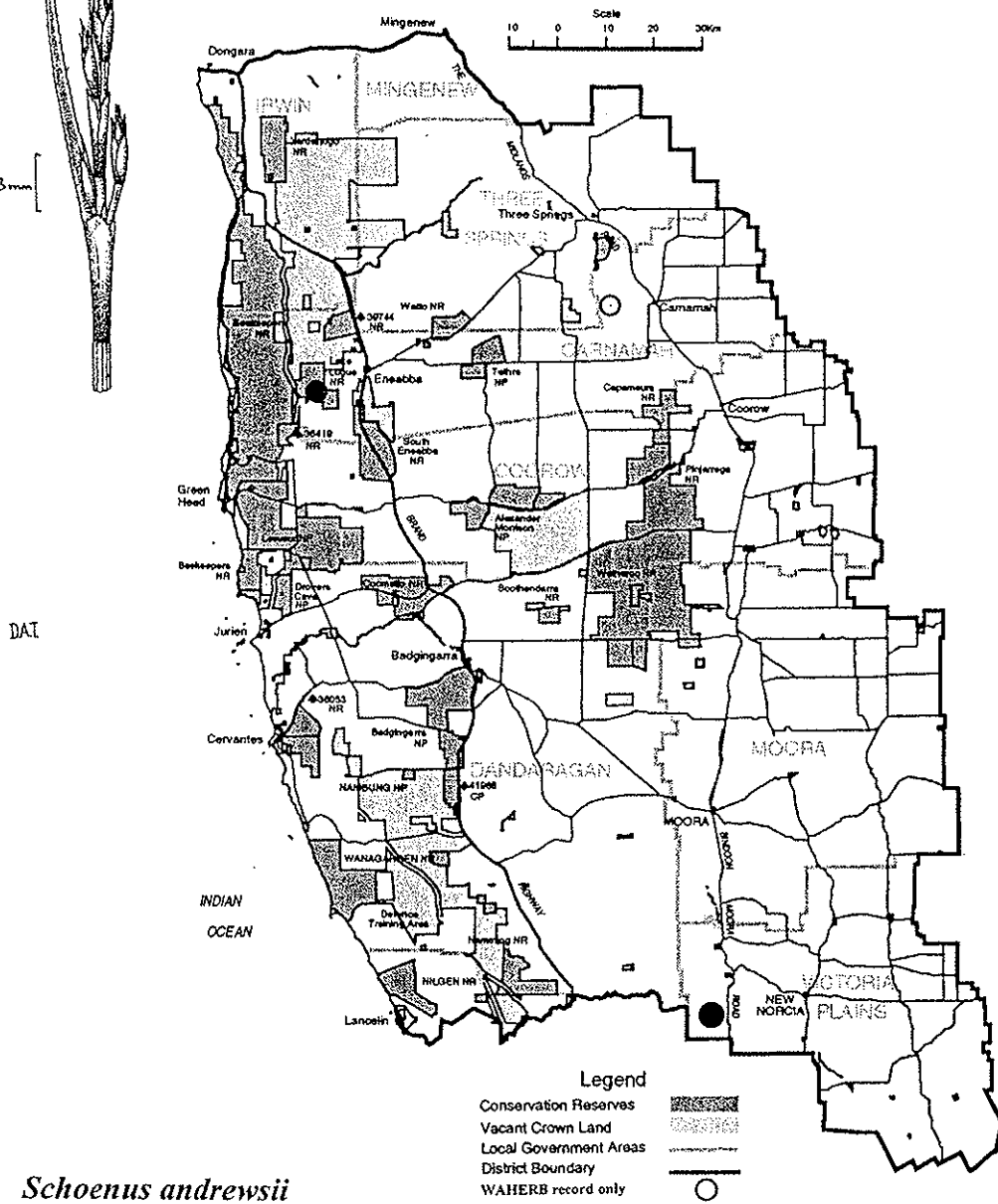
#### **References**

Fitzgerald (1903), Kelly *et al.* (1993), Marchant *et al.* (1987).





Locality Map



● *Schoenus andrewsii*

This species was first collected in 1980 but was not described until 1990, and is known from few collections.

*Stylidium drummondianum* is a perennial herb with short, nodose stems. The leaves are in basal rosettes, each leaf linear in shape, silvery-green in colour, with an incurved bristle-like tip, a membranous ridge on the underside and minutely serrate margins. They are 1-1.5 cm long, 2 mm wide. The flower heads are 5-10 cm tall, with short glandular hairs covering the inflorescences, pedicels, ovaries and calyx lobes. The flowers are orientated vertically, the corolla is pink to purple with the lobes marked red at the bases and the throat yellow. The lobes are elliptic, 4 mm long, 2.5-2.7 mm wide. There are four very small throat appendages, two of which are closely paired. The labellum is orbicular, with a pair of narrow appendages at the base.

This species is related to a group of species including *S. hispidum*, *S. miniatum*, *S. piliferum* and *S. pubigerum*. It differs in the nodose stems, leaf ridges, serrate leaf margins, glandular hairs on the inflorescence, vertical orientation of the flowers and three small throat appendages, one being bilobed.

**Flowering Period:** September

#### **Distribution and Habitat in the Moora District**

Has been collected from two localities in the north of the Moora District from south-east of Dongara and north-west of Three Springs, ca. 40 km apart.

It has been recorded growing on grey sand in a drainage line, in low open heath with occasional *Eucalyptus todtiana* in the westerly site, and in gravelly lateritic soils with *Dryandra hewardiana* and *Allocasuarina helmsii* at the more easterly locality.

#### **Conservation Status**

Current: Priority 1

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. NW of Three Springs	TS	-	22.9.1990	-	-
1.* S of Mount Adams	I	-	10.9.1980	-	-

#### **Response to Disturbance**

Unknown

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

Presumed not susceptible

#### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

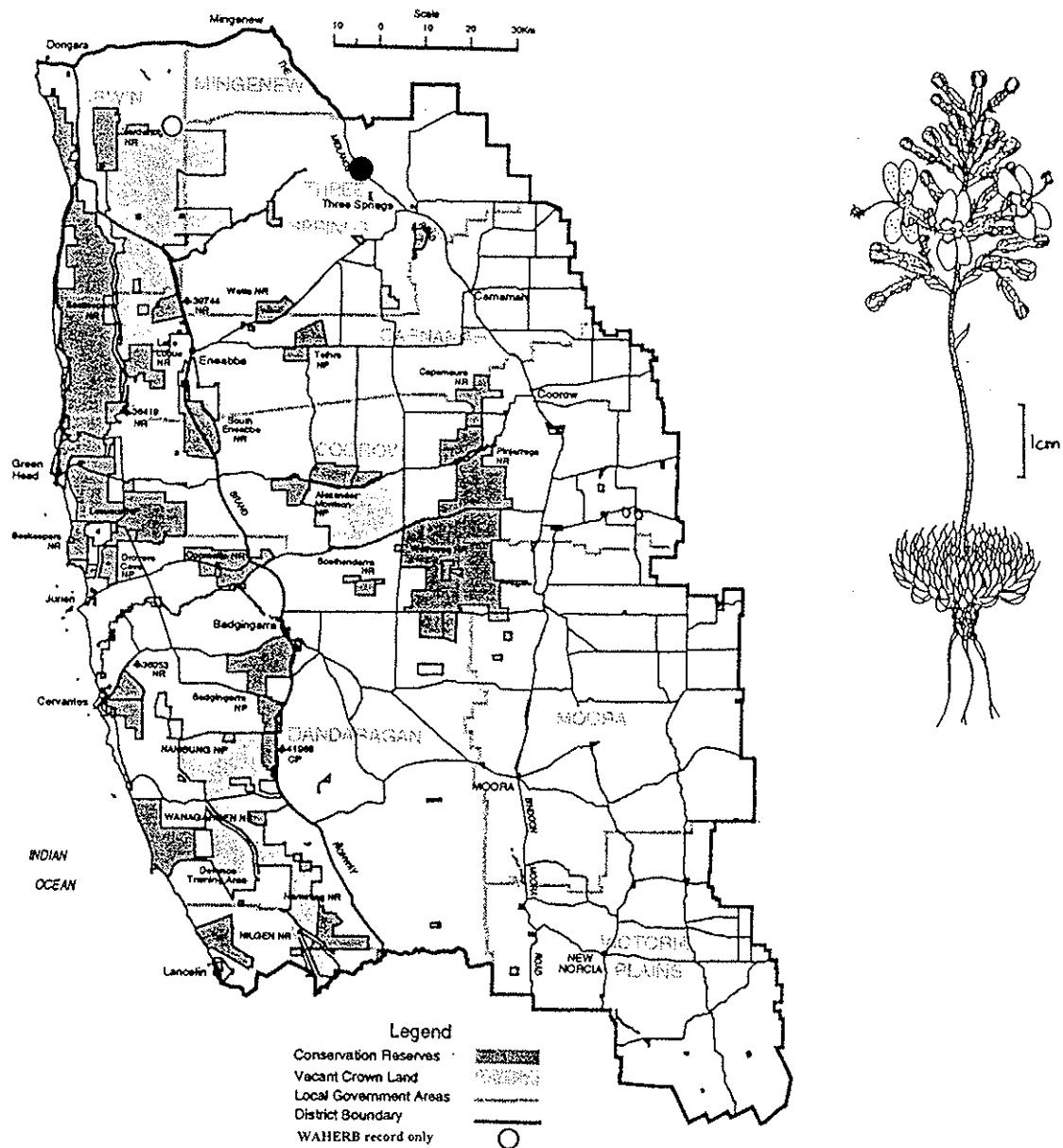
#### **Research Requirements**

- Further survey is required to refind and survey populations 1 and 2 and to find further populations.

References

Lowrie and Carlquist (1991).

Illustration by A. Lowrie.



● *Stylidium drummondianum*

## *Stylidium pseudocaesпитosum* Mildbr.

## STYLIDIACEAE

*Stylidium pseudocaesпитosum* is a perennial plant with the lower stems thickened and scaly with the remains of the old persistent leaf bases. The leaves are finely scabrous with very short, non-glandular hairs and the basal leaves are loosely rosetted, erect and narrow-linear, with short, non-glandular hairs on the margins. They are 2-5 cm long, ca. 2 mm wide. The flowers are in a simple raceme on a scape with appressed bracts. The calyx lobes are free and obtuse. The flowers are white, striped with dark purple, and the corolla lobes are almost equal, oval in shape, 2-4 mm long and ca. 2 mm broad. There are very short, slender throat appendages which are irregularly triangular in shape and membranous. The labellum is small and pointed with two small appendages.

**Flowering Period:** September

### **Distribution and Habitat in the Moora District**

Two collections made in 1901 and 1962 appear to have been made from east of Bookarra, north of Dongara which is now in the Geraldton District. Another made from south of Dongara in 1969 is within the Moora District but this population has not been refound. The species has been collected from three other locations during the 1960s in the Geraldton District. At one location all plants have been destroyed recently during firebreak construction. The second population consists of only two plants. These populations are located east of Walkaway. A third locality further east has not yet been searched.

The species grows in deep, pale yellow sand.

### **Conservation Status**

Current: Priority 1

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* S of Dongara	-	-	7.9.1969	-	-

### **Response to Disturbance**

Unknown

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

Presumed not susceptible

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at population.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### **Research Requirements**

- Further survey work is urgently required, particularly in the areas south of Dongara in the Moora District and north of the Casuarinas in the Geraldton District where the species has been recorded previously but not recently refound.

### **References**

Erickson (1981), Grieve and Blackall (1982), Leigh *et al.* (1984), Mildbraed (1908).

## *Synaphea quartzitica* A.S.George

PROTEACEAE

[*Synaphea* sp. Moora (A.S.George 17055)]

This taxon was known only from one collection made in October 1905 at Moora, until its recent rediscovery by Alex George during work for his revision of the genus *Synaphea*.

*S. quartzitica* is a low subshrub with several stems to ca. 7 cm tall. The leaves have petioles 6-15 cm long. The leaves are pinnately divided, the lobes to 6 mm wide and obtuse and mucronate. They are flat and the apex of the lower lobes is further divided into three. The flower spikes are many-flowered, 6-18 cm long, the peduncle to 3 cm long, and the flowering spikes only a little taller than the foliage. The tubular perianth is yellow and glabrous, the adaxial tepal 4-4.5 mm long, the abaxial tepal 2.5-3.5 mm long. The stigma is oblong to trapeziform in shape, 0.7-1 mm long, 0.3-0.4 mm wide, without prominent lobes. There is an apical ring of translucent glands around the ovary.

This species is distinguished by the combination of the characters of leaf shape, long flower spikes and narrow stigma.

**Flowering Period:** July-August

### **Distribution and Habitat in the Moora District**

Occurs near Moora where it grows on a quartzite hill in tall open shrubland.

### **Conservation Status**

Current: Priority 1<sup>#</sup>

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Moora	Mo	Shire Road Verge	1994	-	-

### **Response to Disturbance**

Unknown

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

Presumed susceptible

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at population.
- The known population should be marked, and land managers informed of the presence of the population to prevent damage.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

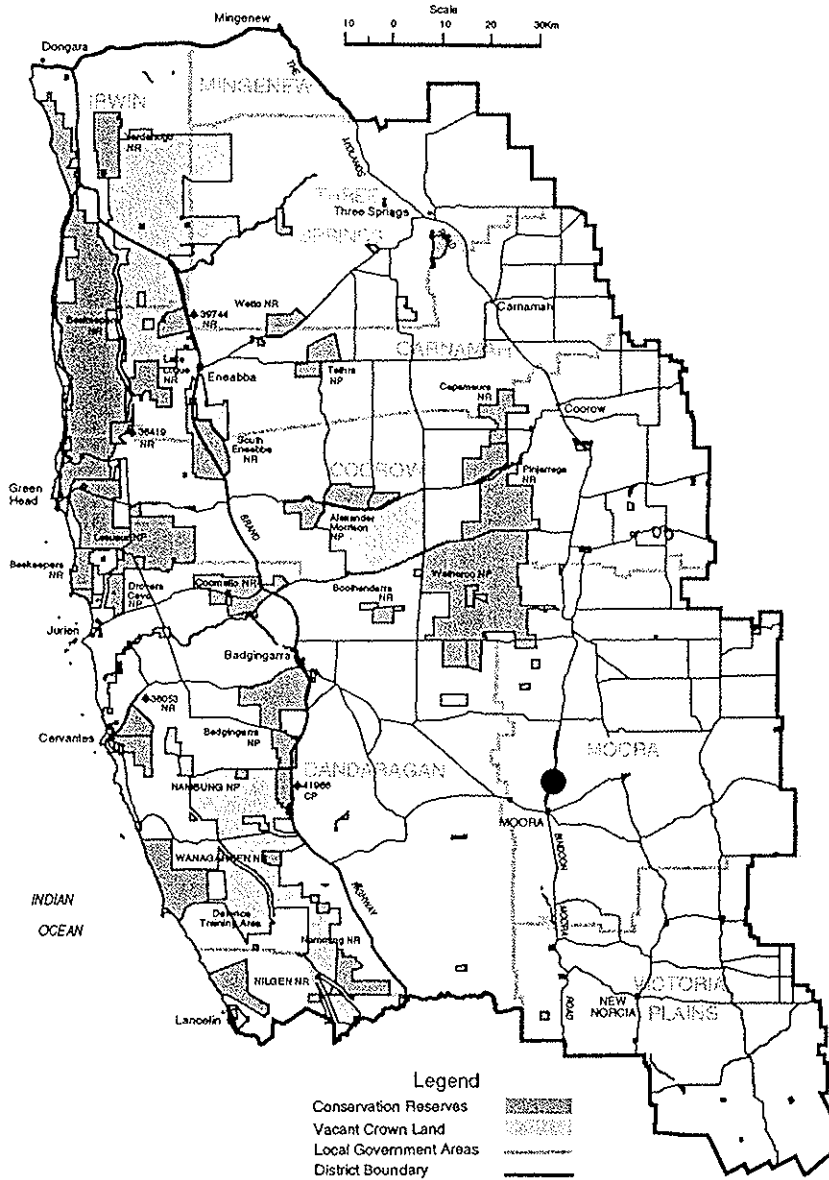
### **Research Requirements**

- Further survey is urgently required.

### **References**

George (1995).

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



● *Synaphea quartzitica*

A small, open shrub to ca. 40 cm tall, with slender, branching stems which are covered with minute protuberances. The leaves are alternate and are broad at the base, narrow-linear above, with revolute margins, nearly glabrous. They are up to 2 cm long and appear to be deciduous towards the base of the plant. The flowers occur singly in the leaf axils and have their parts in fives. Each flower stalk is up to 20 mm long and is very slender. The calyx lobes are dark coloured, elliptic to ovate in shape. The petals are dark pink in colour with a dark patch at the base and are obovate to tongue-shaped, 6-7 mm long. There are usually ten stamens, 3-4 mm long, the filament slender, and hairy, to 0.5 mm long and set at an angle to the body of the anther. The anther is 2 mm long, smooth and shiny, with a broad base contracting gradually to the yellow anther tube which is 1.5-2 mm long, with a broad, almost straight opening.

The species appears to be related to *Tetratheca virgata* and possibly *T. deltoidea*, but differs in the slender anther filaments.

**Flowering Period:** August-November

#### **Distribution and Habitat in the Moora District**

This species is known from one population in the Lesueur area. Previous collections appear to have been made in the same area, apart from a collection made by James Drummond, which is without a precise locality. The type was collected by C.A. Gardner, from Mt Lesueur, and it is thought to have been from the east side (E. Griffin, personal communication).

It has been reported that two other populations of the species are known from the Lesueur area including one from Mt Lesueur, but no precise details are known and voucher specimens have not been lodged at the Western Australian Herbarium (Martinick and Associates 1988). Despite extensive survey over many years in over 500 sites in the Lesueur area, this species has been found only once by Ted Griffin.

It grows on grey sand and lateritic gravel in open wandoo woodland over low, open heath with *Hakea*, *Lambertia* and *Calothamnus* species, herbs and sedges. The known population is on an upper slope facing south-west near the crest of a hill.

#### **Conservation Status**

Current: Priority 1

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. NE of Mt Lesueur	D	Private	20.9.1988	60 est.	Excellent

#### **Response to Disturbance**

Unknown

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

Unknown

## Management Requirements

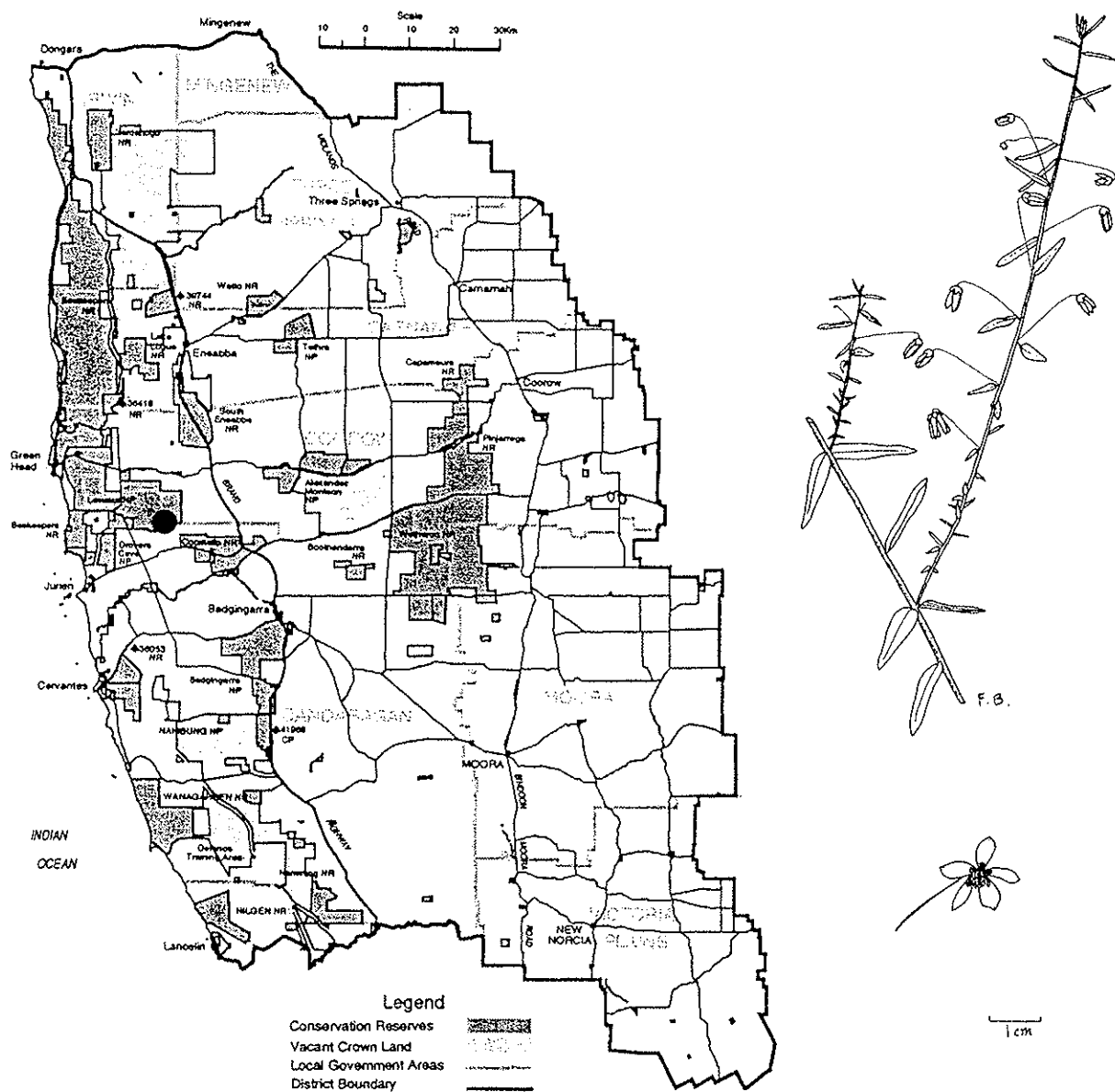
- Monitor the known population, particularly after fire, and inspect any other areas of similar habitat which have been burnt.
- Ensure that dieback hygiene procedures are carried out at population.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

## Research Requirements

- Further survey is required in the Lesueur area.
- Precise details are required for the three populations reported.

## References

Leigh *et al.* (1984), Martinick and Associates (1988), Thompson (1976).



● *Tetratheca remota*



## *Thomasia formosa* Paust

## STERCULIACEAE

Handsome *Thomasia*

An erect, multistemmed shrub to 70 cm tall with branchlets, leaves and inflorescence covered with reddish, stellate hairs. The leaves are alternate, with stalks 5 mm long. They are narrowly ovate, 20-40 mm long, 4-10 mm wide, finely wrinkled on the upper surface. The paired stipules at the base of each leaf stalk are leaf-like, obliquely ovate, 4-7 mm long. The inflorescence is a raceme 70-120 cm long, arising opposite a leaf. Each flower head has 7-many flowers and may be branched. There are three lanceolate bracteoles 7 mm long above the calyx which is pink, papery and 10 mm long. It has stellate hairs and is divided to below the middle into five ovate lobes with thickened ribs. The petals are spatulate in shape, slightly concave, without hairs, 1 mm long. There are five narrowly triangular anthers. The ovary is three-celled, with a covering of white, stellate hairs and the style is glabrous, thread-like, 3 mm long.

This species is similar to *Thomasia angustifolia* and *T. petalocalyx* but has much larger flowers and inflorescence and also differs in the form of the leaves.

**Flowering Period:** August-October

### **Distribution and Habitat in the Moora District**

This species is known only from a small area west of Three Springs, where it was first collected in 1972 and still occurs along 500 metres of road verge.

It occurs on red-brown lateritic soils, in open woodland of *Eucalyptus wandoo*, with low scrub. Associated species include *Allocasuarina campestris*, *Dryandra* and *Grevillea* species.

### **Conservation Status**

Current: Priority 1

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. W of Three Springs	TS	Shire Road Verge, Private	2.10.1990	4+	Disturbed and grazed

### **Response to Disturbance**

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

Unknown, but thought to be high.

### **Management Requirements**

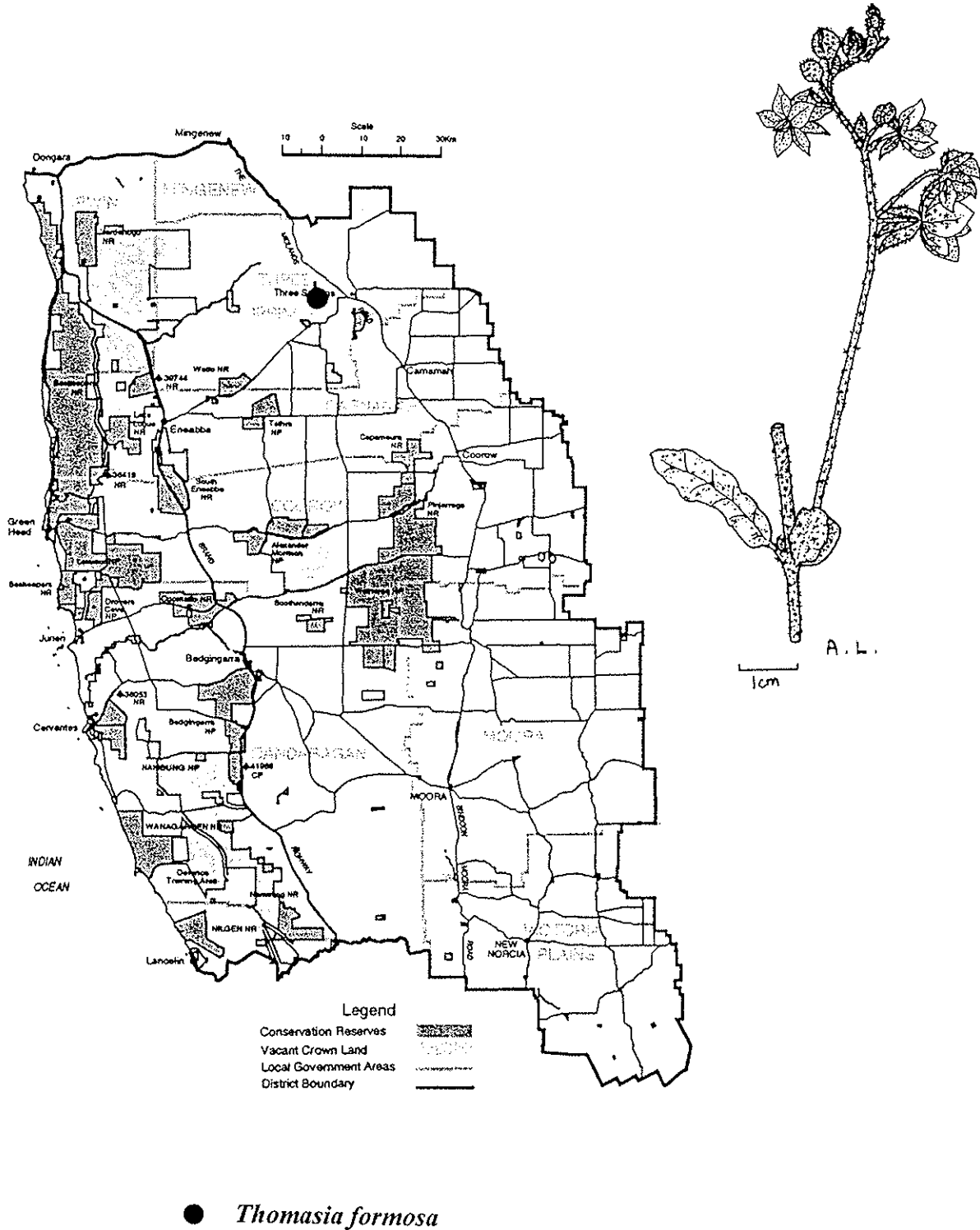
- The known population should be monitored.
- Ensure that road markers are present.
- Ensure that dieback hygiene procedures are carried out at population.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

## Research Requirements

- Further survey is urgently required, particularly on nature reserves in the area of its known occurrence and in remnant vegetation in the area.

## References

Paust (ca. 1973, 1974).



A shrub to 2.5 m tall with a covering of soft, small, whitish hairs, without rigid hairs. The leaves have a close covering of soft, whitish hairs on both sides and are only slightly lobed. They are ovate-cordate in shape, to ca. 4 cm long. The stipules are leafy, oblique or kidney-shaped. The flowers are in slender racemes with rather small flowers. There are three oblong-linear bracteoles. The calyx is up to ca. 12.5 mm in diameter, mauve-pink in colour, with broad lobes less than half the length of the calyx and each with a prominent midrib. There are usually no petals or only incomplete ones present. The anthers taper to a long point and staminodes are not present. The ovary is tomentose and three-celled and the style is hairless.

This species is related to *Thomasia grandiflorum*. Specimens collected from the Wongan Hills area have been annotated by S. Paust in 1973 as differing from the Type description of the species in having large, circular, stellate hairy petals. Another specimen from the same area has been identified as *T. tenuivestita* by C.A. Gardner, who noted that the specimen was larger and coarser in form and indumentum than *T. tenuivestita* but best regarded as that species. He considered that a further specimen from the area agrees with the specimen collected by Burges in 1860 from S.W. Australia but not with the Type. It appears that further taxonomic study is required to elucidate the status of this species.

**Flowering Period:** July-October

#### **Distribution and Habitat in the Moora District**

*T. tenuivestita* was originally collected from the Murchison River, in the Geraldton or Gascoyne Districts. Several collections have been made from the Wongan Hills area in the Merredin District and also from Bendering in the Narrogin District.

Specimens identified as this species have been collected from Winchester in the Moora District but the species was not refound in that area during this survey.

It is recorded from a granite rock in the Wongan Hills area and at Winchester from grey loam over clay, with York gum, *Acacia* sp., *Dianella* sp. and *Podolepis canescens* with wild oats.

#### **Conservation Status**

Current: Priority 1

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* Winchester	Ca	-	8.10.1982	-	Population thickly infested with wild oats

#### **Response to Disturbance**

Unknown

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

Unknown, but thought to be high.

#### **Management Requirements**

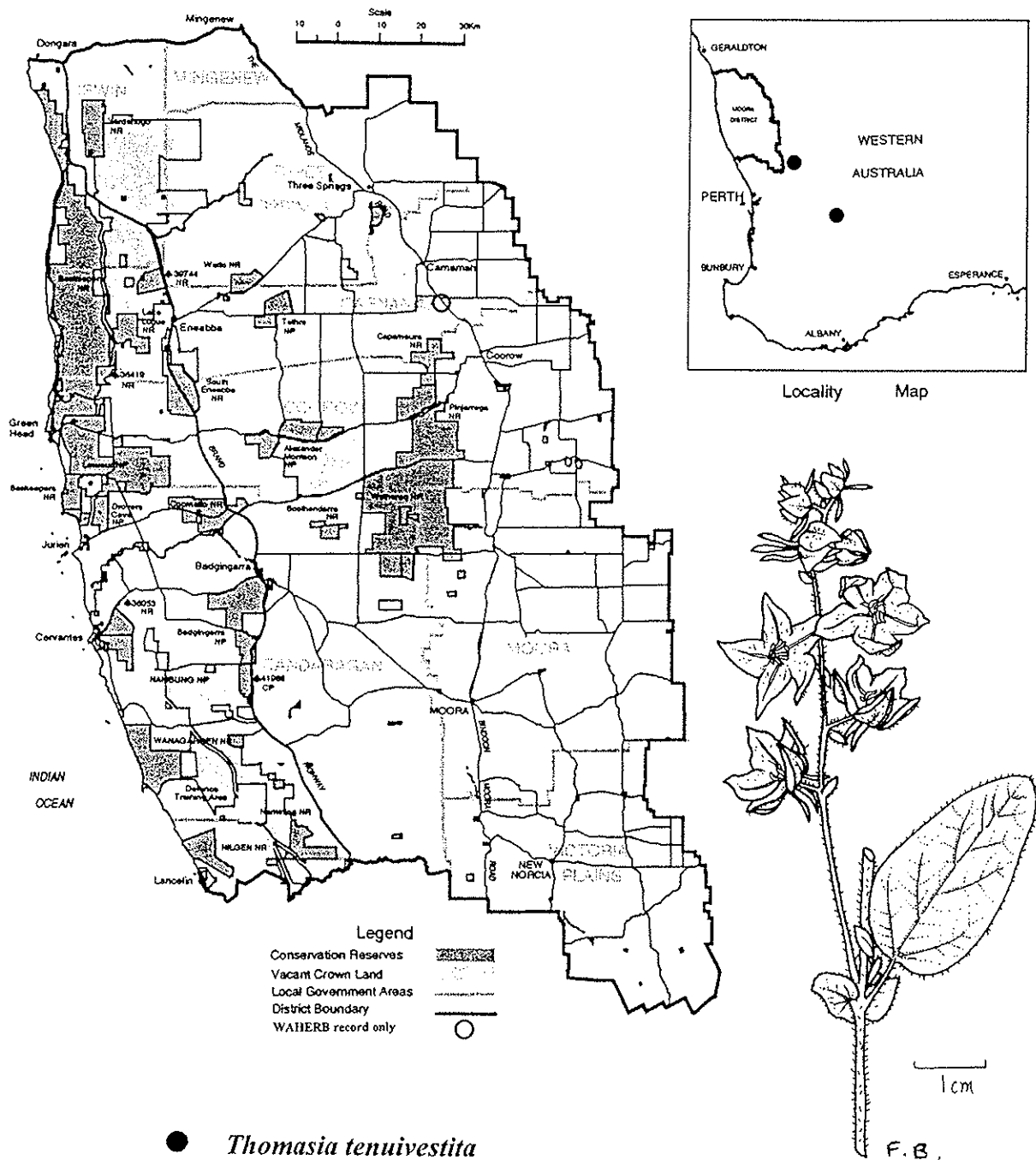
- Ensure that dieback hygiene procedures are carried out at population.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

## Research Requirements

- Further survey is required.
- Taxonomic research is required to elucidate the status of this species.

## References

Bentham (1863), Blackall and Grieve (1985), Mueller (1860), Paust (ca. 1973).



A shrub with stems, leaves and flowers covered with stellate hairs, often rusty in colour on the leaves and stems. The leaves are alternate, with petioles ca. 1 cm long, and without stipules. They are flat, cordate in shape, to 4 cm long. The flowers are in racemes to 7 cm long, with up to five flowers. There are three thread-like bracteoles, covered with long stalked stellate hairs beneath each calyx. The calyx is spreading and divided to below the middle, with three prominent veins on each blunt lobe. It is covered with stellate hairs and is pink or lilac in colour. The petals are absent and the anthers are narrowly triangular in shape, longer than the filaments and opening inwardly in slits. The ovary is papillate and three-celled. The style is narrow and hairless.

**Flowering Period:** November-December

#### **Distribution and Habitat in the Moora District**

This species had been collected only three times, twice in 1918 and once in 1955, from New Norcia.

No details of habitat have been recorded.

#### **Conservation Status**

Current: Priority 1

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.*New Norcia	VP	-	29.11.1955	-	-

#### **Response to Disturbance**

Unknown

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

Unknown, but thought to be high.

#### **Management Requirements**

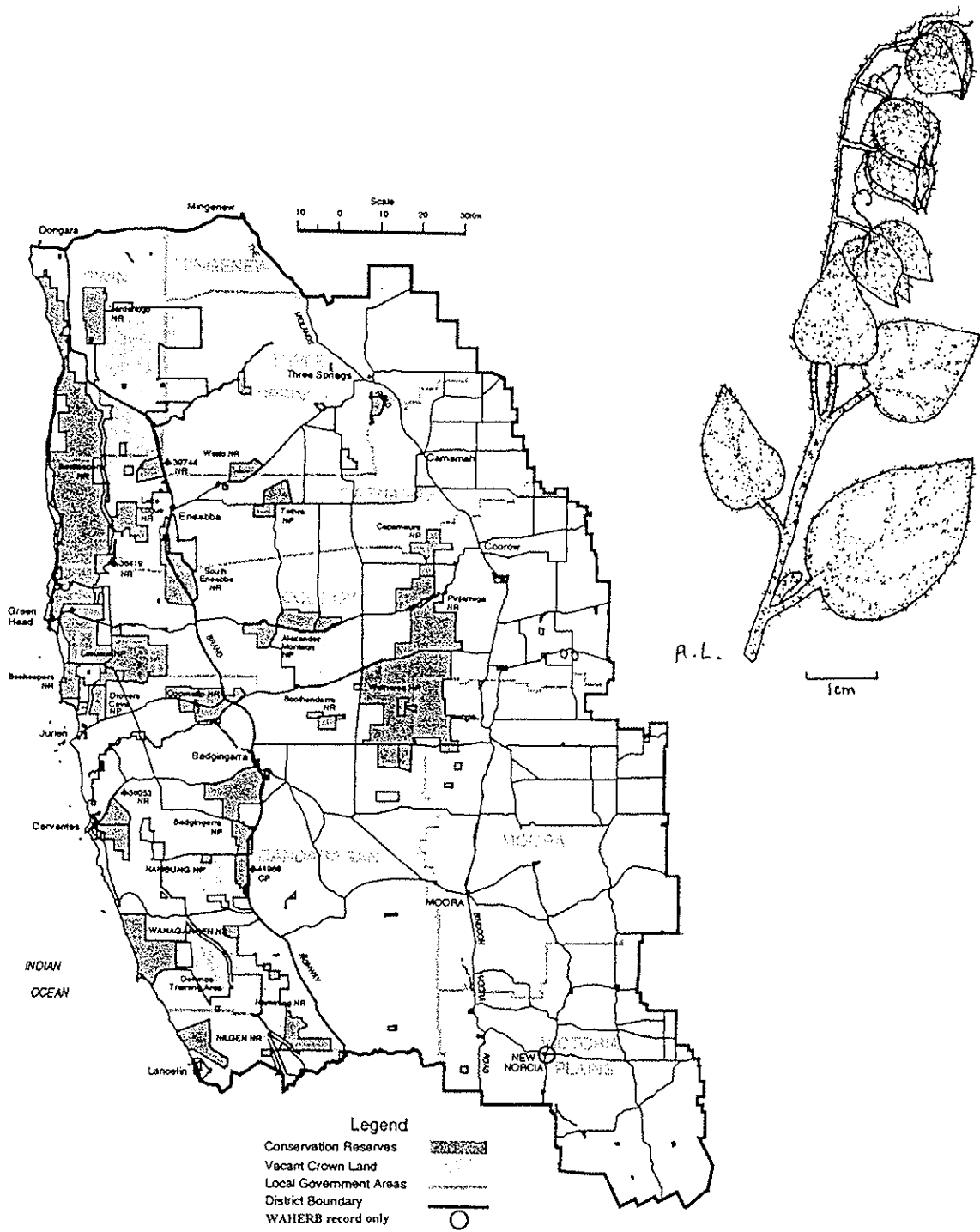
- The population requires fencing.
- Maintain liaison with landowner.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

#### **Research Requirements**

- Further survey is required on remnant vegetation in the area.

#### **References**

Paust (ca. 1973).



*Thomasia* sp. New Norcia (Cayser s.n. Nov. 1918)

A low shrub to ca. 40 cm in height, multistemmed from the root stock. The branchlets and lower surface of the leaves are covered with greyish stellate hairs. The leaves are flat, narrowly elliptic, to 1.3 mm long and 5 mm wide. The inflorescences are racemes of about three flowers. There are three narrow bracteoles. The calyx is ca. 7 mm long, divided less than half way into five obtuse, arching lobes. It is mauve in colour with the ribs and base of calyx reddish-purple. The petals and anthers are dark purple-black. The petals are rounded, ca. 0.5 mm long and hairless. The anthers are narrowly triangular. The ovary is stellate hairy and the style is hairless.

**Flowering Period:** October

#### **Distribution and Habitat in the Moora District**

This taxon had been collected only once in 1972 from a few kilometres south of New Norcia. It was not refound there during this survey. However, more recent survey for the species has discovered two small populations ca. 1 km apart in remnant native vegetation.

It grows in open wandoo woodland on red-brown loam with laterite and quartz nodules. *Calothamnus*, *Grevillea*, *Melaleuca* and *Glischrocaryon* species grow in association with the populations. It was originally recorded growing on a rocky rise in wandoo woodland.

#### **Conservation Status**

Current: Priority 1<sup>#</sup>

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of New Norcia	VP	Private	11.10.1995	13	Moderate-good
2. SW of New Norcia	VP	Private	11.10.1995	8	Moderate-good
3.* S of New Norcia	VP	-	9.10.1972	-	-

#### **Response to Disturbance**

Unknown

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

Unknown, but thought to be high.

#### **Management Requirements**

- Maintain liaison with landowners.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

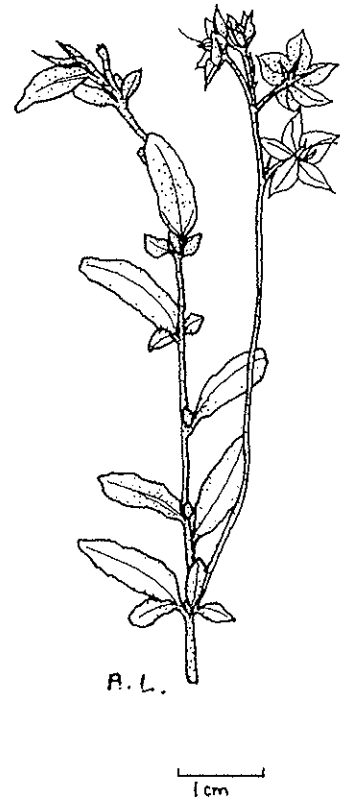
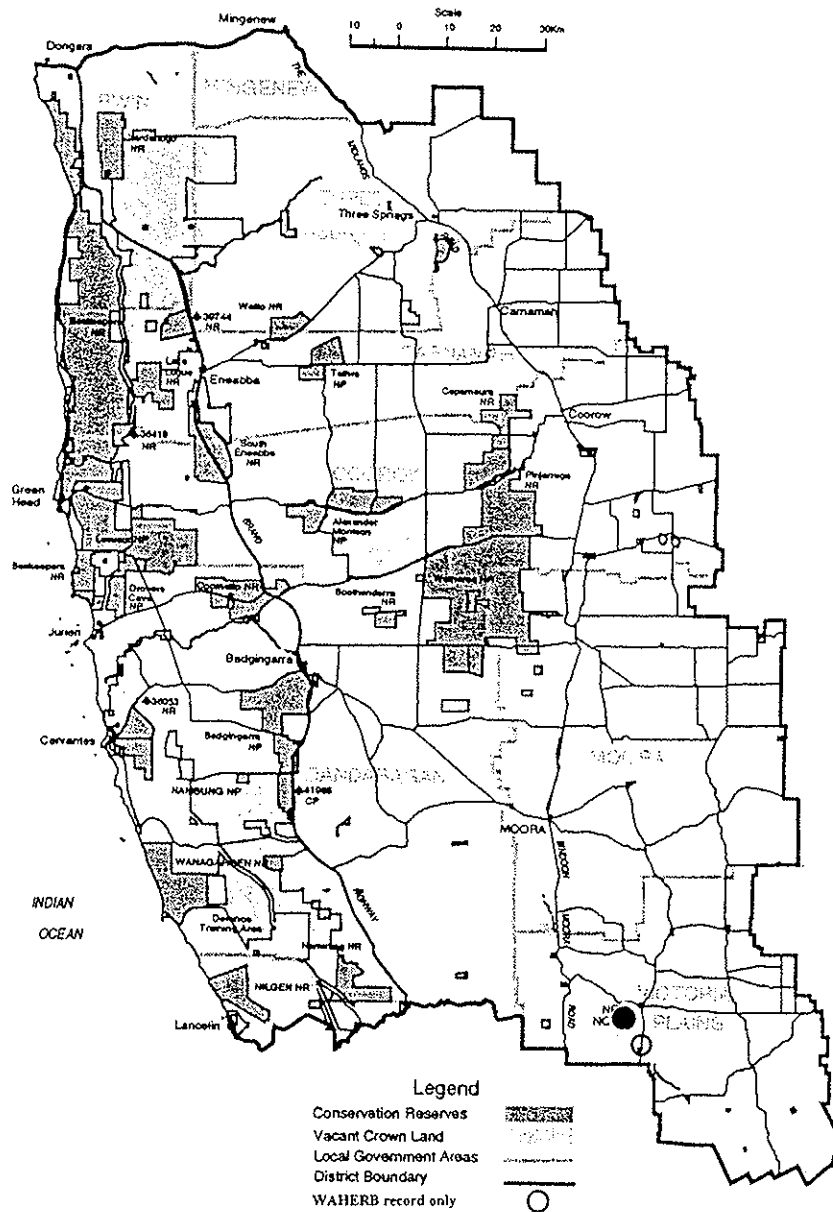
#### **Research Requirements**

- Further survey is required on conservation reserves and remnant vegetation in the area.

#### **References**

D. Papenfus (personal communication), Paust (ca. 1973).

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



*Thomasia* sp. Green Hill (S.Paust 1322)



A perennial herb with tuberous roots. There are one or two basal leaves, 10-25 cm long, linear with warty margins and acute tips, expanding at the base into membranous wings. There are one or two flowering stems, 14-35 cm tall, branching equally in the upper half. The inflorescences are flat-topped clusters of two to six flowers with pedicels 4-5 mm long. The six purple perianth segments are 10 mm long, the outer three are narrow with membranous margins, the inner three elliptic with fringed margins. There are six stamens, purple at the base, becoming yellow towards the apex. The outer three anthers are 2.5-3 mm long, the inner three are 4 mm long. They are straight and twisted. The ovary is globular and sessile with a straight style 3.5 mm long.

This species is distinguished from other species of *Thysanotus* with tuberous roots by the dichotomously branched flowering spike and by the almost equal, straight, not curved anthers.

**Flowering Period:** September-October

#### Distribution and Habitat in the Moora District

When described in 1960 this species was known only from the Lesueur area. More recent collections have been made from north of Badgingarra, and Eneabba to the northern boundary of the District south of Mingenew. It has been recorded recently from five locations in the Lesueur National Park, generally from north-east of Mt Lesueur (E. Griffin, personal communication).

Grows in yellow sandy loam or orange loamy sand and ferruginous clay, in winter-wet areas in heath, mallee heath or wandoo woodland. Associated species include *Eucalyptus todtiana*, *E. calophylla*, *E. gittinsii*, *Thryptomene proliferata*, *Melaleuca uncinata*, *Allocasuarina campestris*, *Verticordia chrysanthella* and *Borya sphaerocephala*.

#### Conservation Status

Current: Priority I

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Richardson Road, S of Mingenew	TS	-	26.10.1992	-	-
2. NE of Eneabba	Ca	Nature Reserve	5.10.1992	-	-
3. N of Badgingarra	D	Shire Reserve	24.9.1988	-	-
4.* NNW of Badgingarra	D	-	30.9.1967	-	-
5.* E. of Jurien	D	-	30.9.1967	-	-
6.* Cockleshell Gully	D	-	30.9.1967	-	-
7.* Lesueur Track	D	-	30.9.1967	-	-
8.* S of Mt Lesueur	D	-	2.10.1955	-	-
9.* S of White Lake	Co	?Private	27.9.1952	-	-
10.* S of Lake Logue	Ca	?Private	27.9.1952	-	-

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

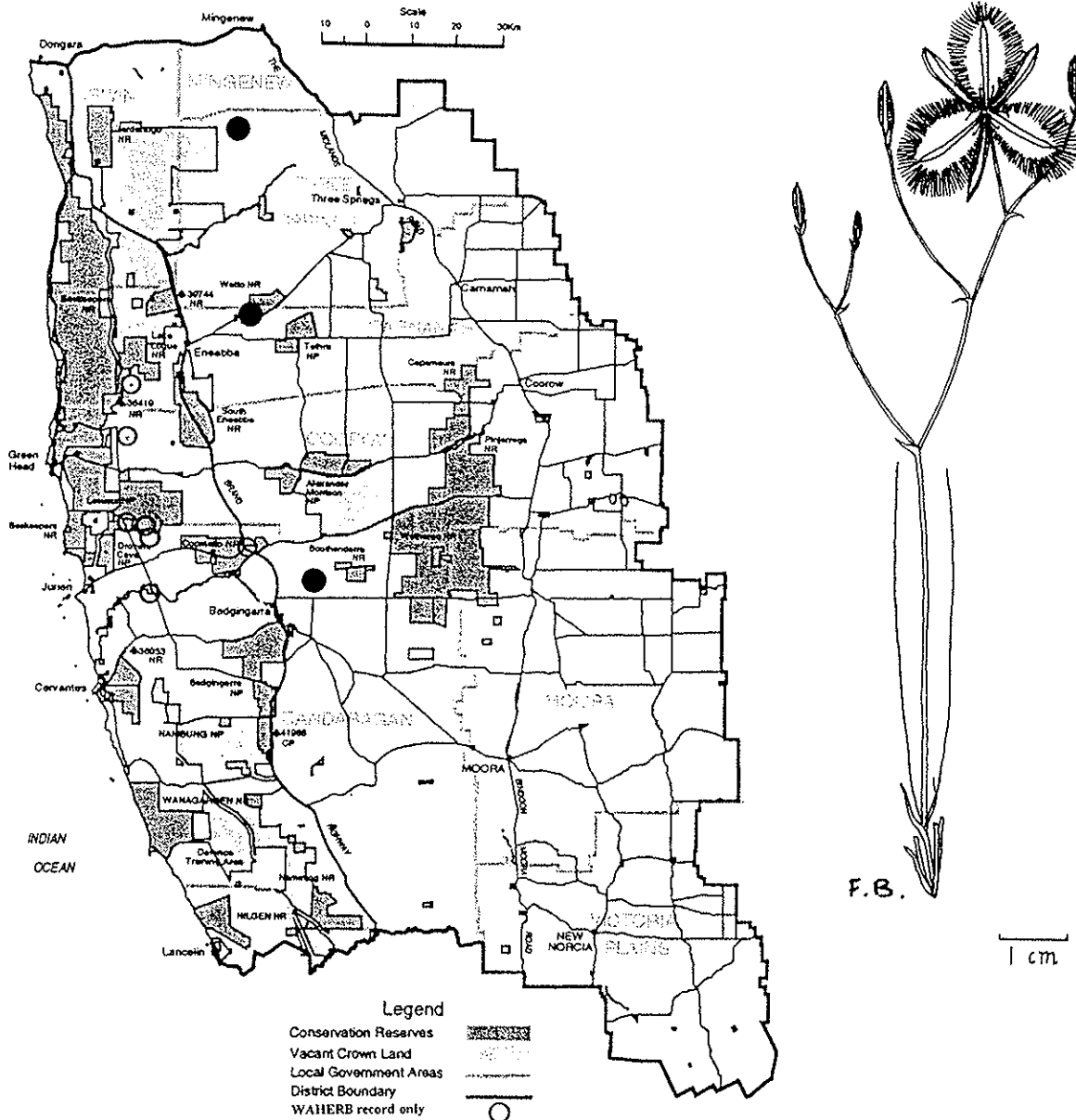
- Further survey.
- Ensure that dieback hygiene procedures are carried out at all populations.

### Research Requirements

- Further survey is required to fully survey populations 2, 3 and 6 and to refind all populations recorded earlier.

### References

Brittan (1960, 1981, 1987).



● *Thysanotus vernalis*

A tall open shrub to 2 m high and 90 cm wide with bluish-green leaves which are rounded in shape, and entire, 4-7 mm long, 3.5-8 mm wide. They are arranged in pairs, with successive pairs at right angles. The bracteoles are persistent. The flowers are borne in the axils of the opposite, decussate leaves so that they are arranged in four rows down the stem. They are silvery pink-mauve in colour with a deep pink centre. They vary in intensity of colour and may even be cream. The peduncles are 1-1.5 mm long. The sepals are 4-5 mm long with 7-10 lobes with prominent silvery fringes and with peltate basal auricles covering the hypanthium. The fringed petals have small basal auricles and are 5-5.5 mm long. The staminodes are shorter than the stamens. They are linear-subulate in shape and are entire but have a few prominent oil glands. The anthers are attached basally with a swollen filament apex and open by slits. The style is straight and is 4.5-5 mm long, with a beard of hairs ca. 0.3 mm long over the upper third.

This species is related to *Verticordia muelleriana* but differs in flower colour, in the straight bearded style and the short, sparsely glandular staminodes.

**Flowering Period:** November-March

#### Distribution and Habitat in the Moora District

This species is known to occur over a narrow range of ca. 8 km to the south of Eneabba. There is also mention in a letter from Drummond to Hooker that a *Verticordia*, lilac flowered, with glaucous, heart-shaped, indented leaves and unbranched stems terminating in small corymbs of flowers, was found about nine miles north of the Hill River and near the base of Mt Lesueur (Burbidge *et al.* 1990). However, *V. fragrans* has similar leaves and corymb-like inflorescences of pink flowers terminating the stems, whereas *V. argentea* has racemes of flowers which are not terminal. *V. fragrans* has been collected recently from south-east of Mt Lesueur, whereas *V. argentea* has not been recorded from this area more recently.

*V. argentea* grows on white to yellow lateritic sand, grey or black humus sand or brown coarse sand, or on white sand over red gravelly loam. It occurs in open shrubland with a closed shrub understorey to 0.8 m high, or open low woodland over low open heath or scrub to 2m. Associated species include *V. aurea*, *V. grandis*, *Eucalyptus todtiana* and *Banksia* species.

#### Conservation Status

Current: Priority 1

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. S of Eneabba	Ca	Nature Reserve	8.1.1992	1000+	Undisturbed
2. S of Eneabba	Ca	MRWA Road Verge	6.11.1992	10+	Partly disturbed
3. SSW of Eneabba	Co	Nature Reserve	2.12.1992	Many plants	-
4.* S of Eneabba	-	-	16.12.76	-	-
5.* S of Eneabba	Ca	-	26.11.88	1	-

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora Dieback*

Presumed susceptible

## Management Requirements

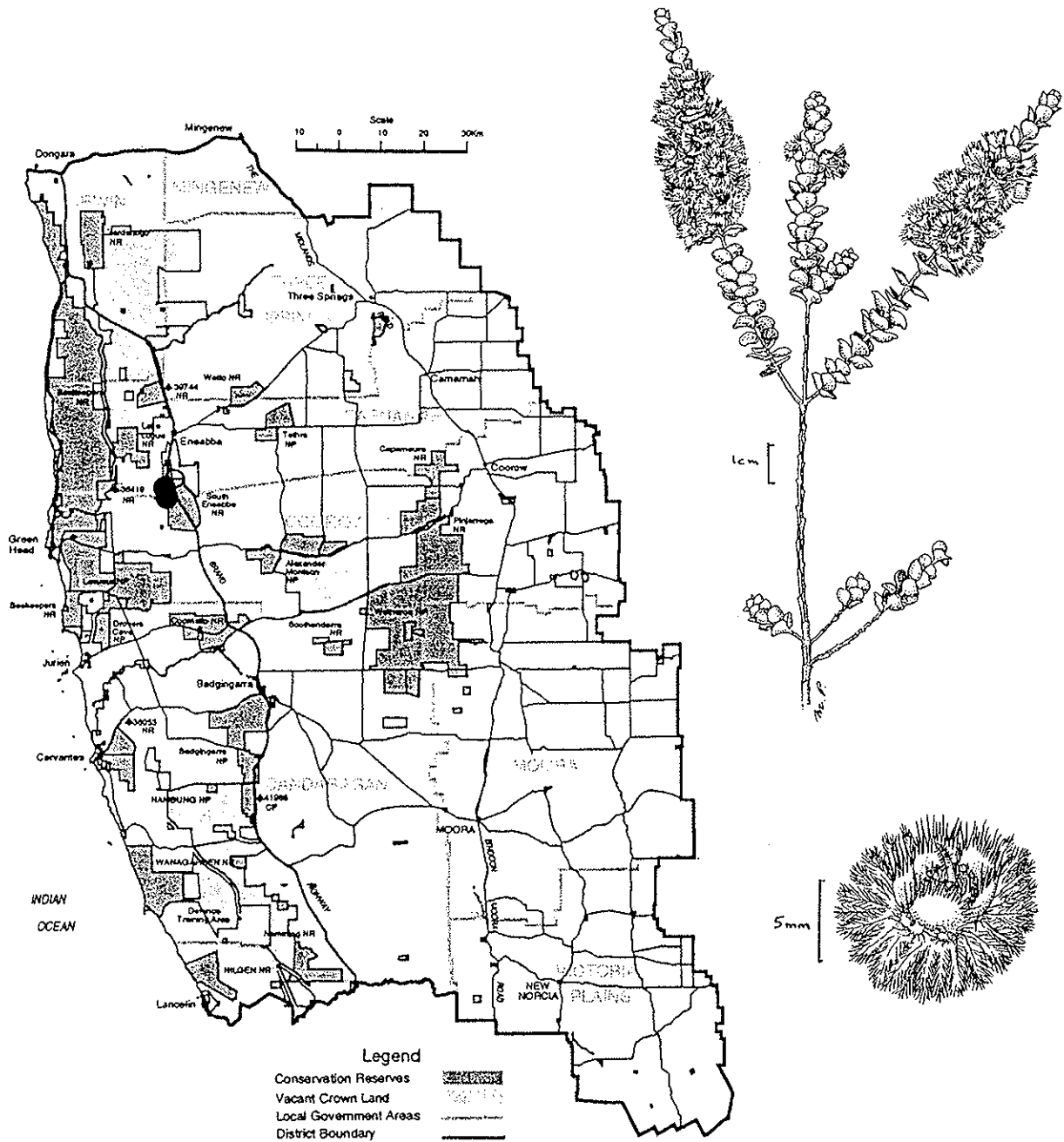
- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that markers are in place at population 2.

## Research Requirements

- Further survey is required, particularly in the Lesueur area.

## References

Burbidge *et al.* (1990), George (1991).



● *Verticordia argentea*

An erect, diffuse shrub to 90 cm tall with narrowly elliptic leaves 1.5 to 4 mm long. The bracteoles are entire. The flowers are pink in colour, in dense spikes at the end of the branches. Each flower has five green reflexed appendages from the apex of the hypanthium with acute free apices. The sepals are 6 mm long, with 6 or 7 lobes and with distinct reflexed auriculate appendages. The petals are 6 mm long, with a fringe which is 2.5-3 mm long, the segments of which are further fringed. The stamens are 3 mm long, glabrous as are the staminodes which are narrow at the apex. The anthers have a swollen filament apex and open by slits. The style is 5 mm long and is bearded below the apex.

This species is distinguished by the fringed segments of the petal fringe and by the thick hypanthium appendages with acute free apices. The petal fringe distinguishes *Verticordia bifimbriata* and *V. paludosa* from other pink flowered species in this section of *Verticordia*. *V. bifimbriata* is distinguished from *V. paludosa* by the auricles on the sepals, the free apices of the hypanthium appendages and the slightly larger flowers. There are also habitat differences.

The petal fringe is only slightly bifimbriate in the specimens collected near York and at Boyagin.

**Flowering Period:** October to January, March, April and June

#### **Distribution and Habitat in the Moora District**

This species is known in the Moora District from one population in the south of the District to the west of Mogumber. It has also been recorded from the Wannamal area, from north-east of Toodyay and west of York in the Swan Region, and further south from the Boyagin and Dryandra areas in the Narrogin District.

It grows in grey sand and gravel in open shrub mallee with low scrub and sedges, with *Eucalyptus tottiana* and *Leptospermum* sp. near Mogumber. Further south near Wannamal it grows on gravel or gravelly loam in open wandoo woodland. Elsewhere it has been recorded on yellow sand, laterite over granite in powderbark wandoo woodland, yellow gravelly sand in jarrah woodland over heath or yellow loamy sand over laterite in heath with *E. drummondii* and *Banksia sphaerocarpa*.

#### **Conservation Status**

Current: Priority 1

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. W of Mogumber	VP	Shire Road Verge	28.4.1992	50 est.	Population partly disturbed and infested with weeds

#### **Response to Disturbance**

Unknown

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

Presumed susceptible

### Management Requirements

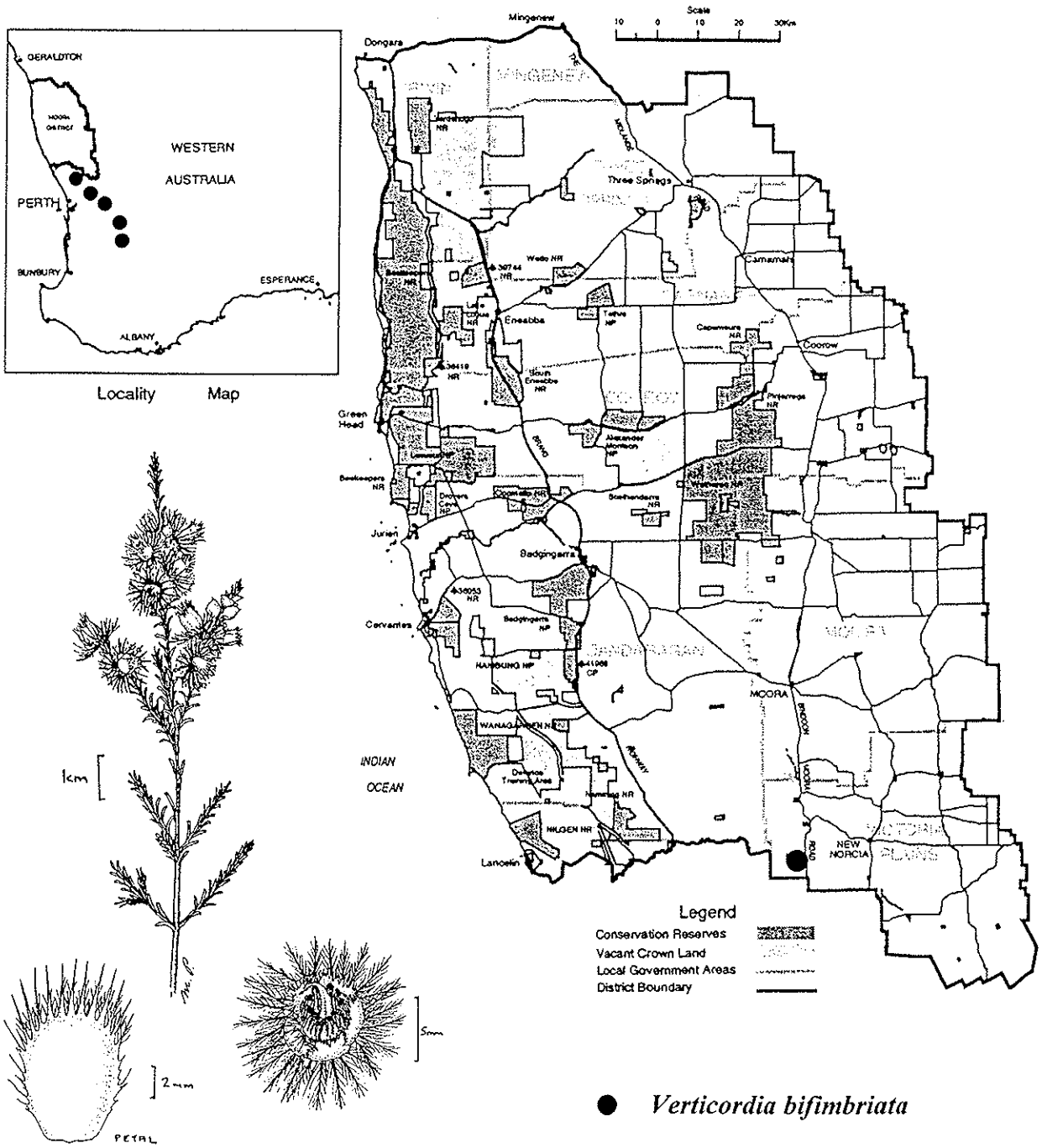
- Ensure that dieback hygiene procedures are carried out at population.
- Ensure that the population is marked.
- Maintain liaison with the Shire.

### Research Requirements

- Further survey is required, in the Moora District to find new populations, and in the Swan Region and Narrogin District to refine and survey fully populations known from specimens at the Western Australian Herbarium.

### References

George (1991).



An erect open shrub to 2 m, with rounded, entire leaves, 2-4. mm long. The bracteoles are persistent. The flowers are pale yellow, the sepals are 4 mm long, with plumose lobes and peltate basal auricles covering the hypanthium. The petals are fringed, 4 mm long, with small basal auricles. The stamens have anthers attached basally with a swollen filament apex, the staminodes are channelled and flared towards the apex. The style is 4.5-5.5 mm long, with a one-sided and tufted beard, the hairs to 0.8 mm long.

This species is related to *Verticordia lepidophylla* but differs in its larger leaves with spreading tips, the larger sepals and larger fringed petals and shorter style with tufted beard. The two species occur in separate areas.

**Flowering Period:** August-December

#### Distribution and Habitat in the Moora District

Occurs over a range of ca. 25 km between Three Springs and Morawa on the north-eastern border of the Moora District and extending north into the Geraldton District.

Has been recorded growing in deep yellow sand, yellow clayey sand, loamy sand over gravel and in greyish-yellow sand over gravel, in heath, open scrub and open woodland. Associated species include *V. monadelpha*, *V. densiflora*, *V. spicata* subsp. *squamosa* and species of *Eucalyptus*, *Scholtzia*, *Acacia* and *Grevillea*.

#### Conservation Status

Current: Priority 1

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. E. of Arrino	TS	Shire Road Verge	18.8.1993	1	Narrow, weed infested road verge
2. SW of Morowa	TS	MRWA Road Verge	8.12.1992	45	Partly disturbed
3. E of Arrino	TS	Shire Road Verge	8.12.1992	10 est. + 1	Partly disturbed
4. SW of Morowa	TS	?Private	19.9.1991	6 est.	Undisturbed

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

#### Management Requirements

- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that all road verge populations are marked.
- Clarify land status of population 4 and liaise with landowner or manager.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

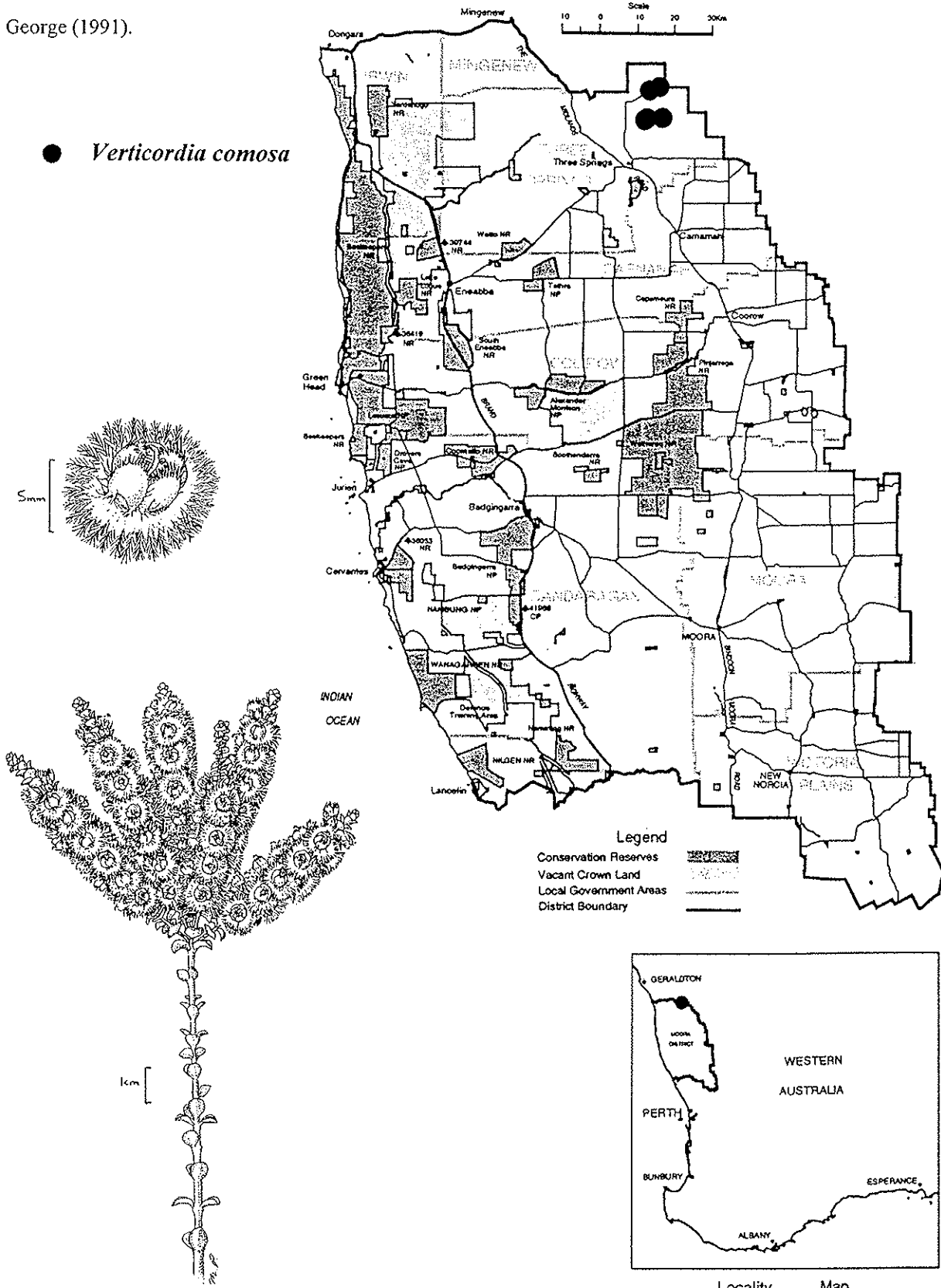
### Research Requirements

- Further survey is required on remnant vegetation in the Moora District and further north in the Geraldton District.

### References

George (1991).

● *Verticordia comosa*





A dwarf, mounded, single-stemmed shrub to 30 cm high and 60 cm wide. The leaves are oblong to elliptic in shape, blunt at the apex, 1.5-4 mm long. They have margins that are irregularly toothed or are edged with fine bristles. The flowers are on stalks 3-6 mm long and they are pale creamish-lemon to bright yellow in colour. The sepals are intricately divided into wide spreading, fringed lobes and are 6-7 mm long. Each petal is fringed and is 3 mm long.

This subspecies differs from the other subspecies in that the linear staminodes are shorter, only 0.7 mm long, whereas in the others they are 1.2 mm or longer. The anthers are globular and the style is 8 mm long with white hairs for up to three quarters of its length.

This species is related to *Verticordia penicillaris* from which it differs in its smaller size and more hairy style. The specific name means hairy or shaggy style. This subspecies was known only from the Arrowsmith area when it was named in 1991, the name "*oestopioia*" is from the Greek for arrow and to make or work, in reference to the name Arrowsmith.

**Flowering Period:** October-early November

#### **Distribution and Habitat in the Moora District**

This taxon was originally collected from a few kilometres south of the Arrowsmith River north-east of Eneabba within the Moora District. It has not been refound at this location and is now known from two small populations west of Bunjil, ca. 5 km east of the Moora District boundary in the Geraldton District and ca. 60 km east of the original collection.

Grows in shallow soils of yellowish-grey clay loam or yellow-grey sand over granite in open shrubland with associated species including *Melaleuca radula*, *Acacia uncinata*, *Mirbelia ramulosa*, *V. monadelpha* and *Dodonaea* sp.

#### **Conservation Status**

Current: Priority 1

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* S of the Arrowsmith River	TS	-	21.10.1982	-	Not refound at this location 19.11.1991

#### **Response to Disturbance**

Unknown

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

Presumed susceptible

#### **Management Requirements**

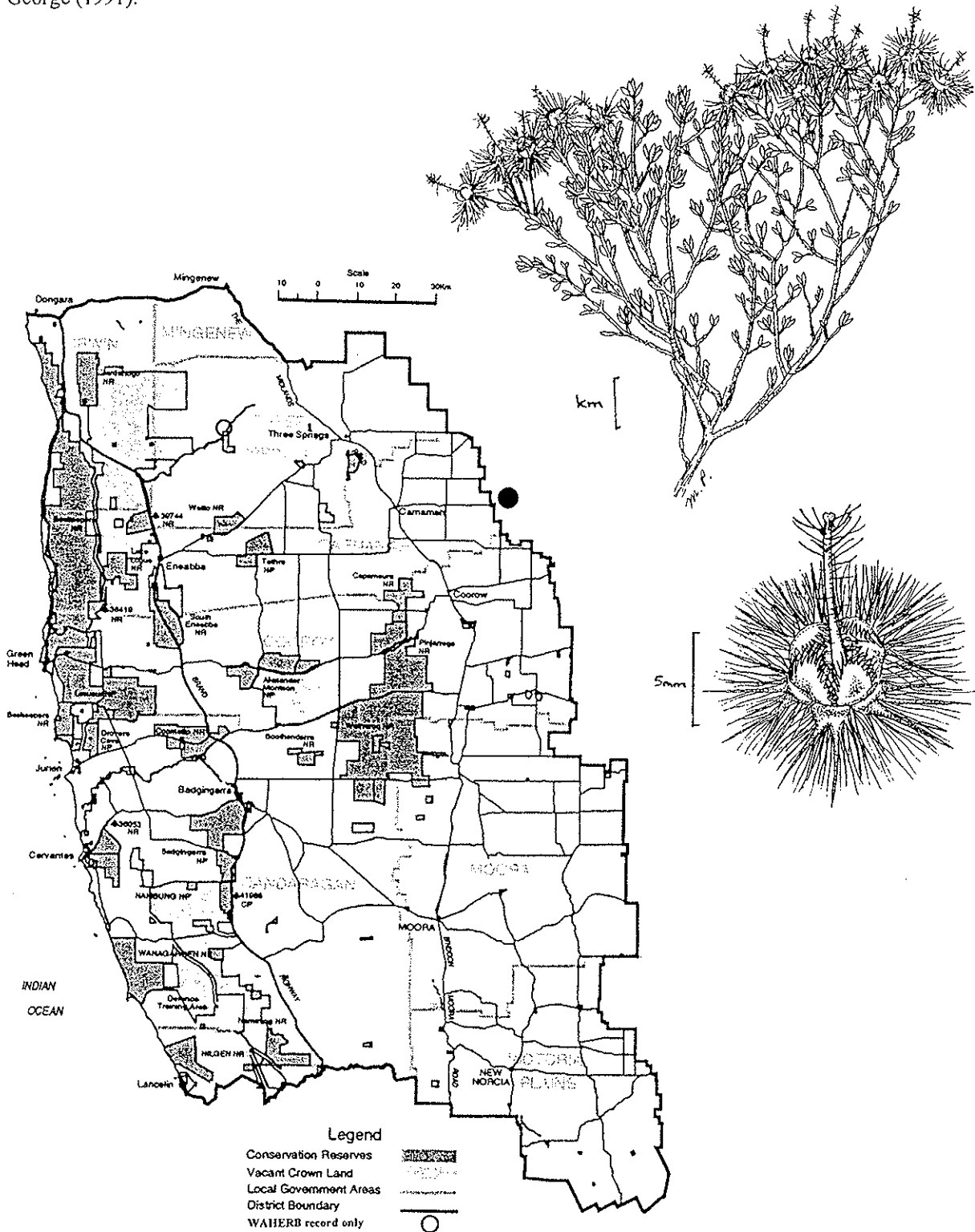
- Ensure that dieback hygiene procedures are carried out at population.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

## Research Requirements

- Further survey is required, particularly in suitable habitat south of the Arrowsmith River.

## References

George (1991).



● *Verticordia dasystylis* subsp. *oestopoa*

An erect shrub 1 to 3 m tall, with open branching. The leaves are orbicular to elliptic and entire in shape, 1.4-4 mm long, the bases partly stem clasping. The flowers are borne on thick stalks in dense spikes towards the ends of the branches. They are pink and white in colour, both sepals and petals being pink at the base and white above so that the flowers are dark pink at the centre. They have a sweet honey scent. The hypanthium is warty glandular and hairless with five green broad, thick appendages from the apex. The sepals are 3.5-4 mm long, with 6-9 broad, plumose lobes and basal auricles covering the hypanthium. The petals are 4-4.5 mm long with small basal auricles. They are 4-4.5 mm long, orbicular in shape, erect and entire with cilia towards the base. The stamens are 3.5 mm long and the staminodes are oblong, acute and incurved, 3-3.5 mm long.

*Verticordia fragrans* differs from closely related species in its pink and white, fragrant flowers, the broad sepal lobes, and entire upper margins of the prominent petals.

**Flowering Period:** Late September-November

#### Distribution and Habitat in the Moora District

In the Moora District this species is known from a few populations to the north and south of Eneabba and one population further south in the Coomaloo area. A collection made in 1959 of uncertain location may be from Dinner Hill, which is ca. 25 km south-east of this, or from Mullewa in the Geraldton District. A recent report of the species has been made from just south of Mullewa so it seems more likely to be the latter.

Grows in deep, white, grey to yellow sand with lateritic gravel beneath or in sandy clay loam in tall shrubland, sometimes with open low woodland of *Eucalyptus todtiana* and *Banksia attenuata* with open heath. Associated species include *V. aurea*, *V. laciniata*, *V. grandis* and *V. monadelpha*.

#### Conservation Status

Current: Priority 1

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. S of Eneabba	Ca	Nature Reserve	6.11.1992	100+	Partly disturbed
2. S of Eneabba	Ca	Nature Reserve	6.11.1992	50	Partly disturbed
3. S of Eneabba	Ca	MRWA Road Verge	6.11.1992	50	Partly disturbed
4. N of Eneabba	Ca	VCL	19.8.1993	50+	Healthy
5. NW of Eneabba	Ca	?VCL	24.11.1993	50+	Healthy
6. NW of Eneabba	Ca	?VCL	24.11.1993	50+	Healthy
7. Coomaloo	D	Nature Reserve	5.11.1988	50+	Excellent
8.* Dinner Hill/Mullewa	-	-	10.1959	-	-
9.* S of Eneabba	Ca	-	17.10.1984	-	-

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

### Management Requirements

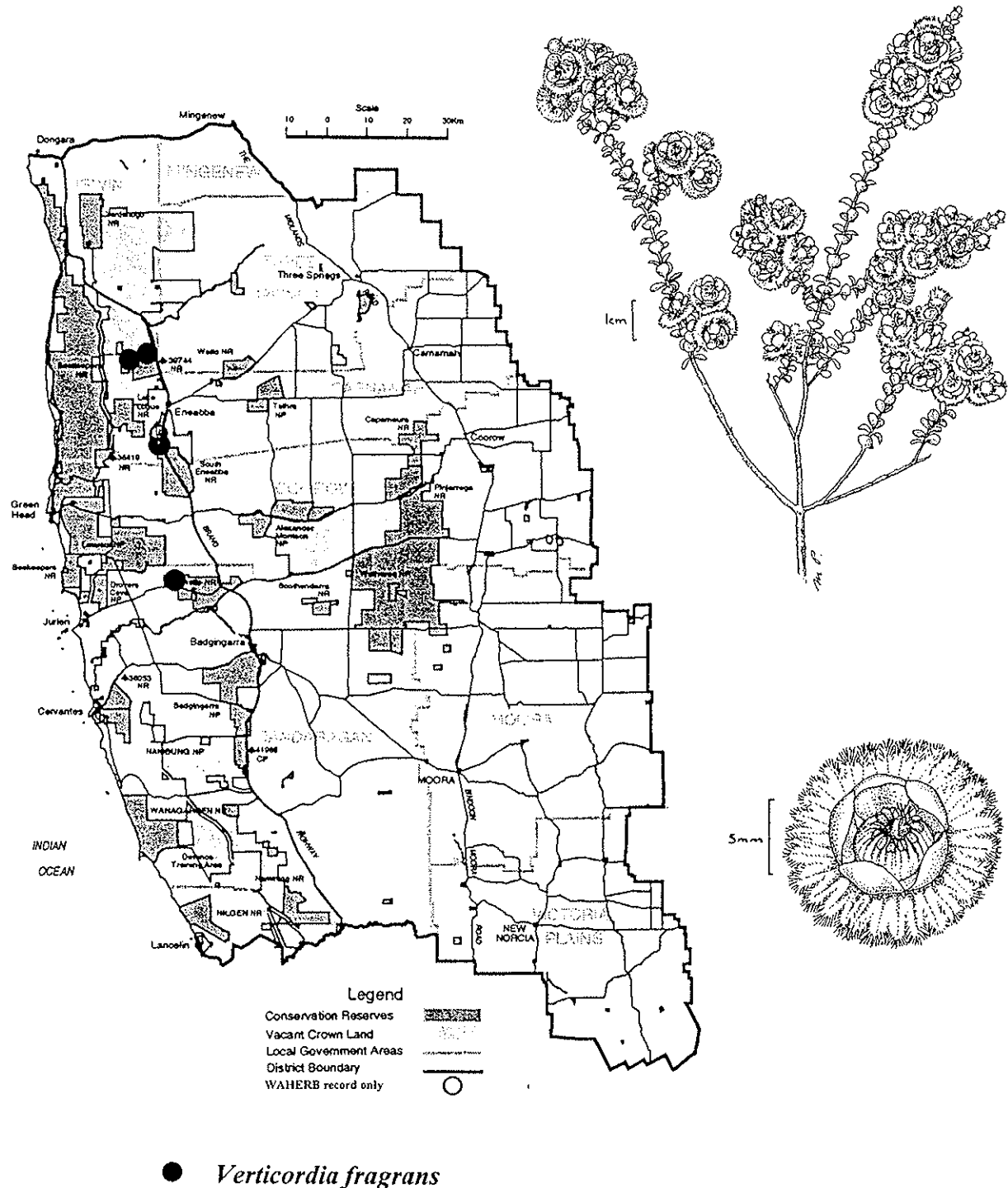
- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that markers are in place at population 3.

### Research Requirements

- Further survey is required, particularly to complete full survey of population 7, and in the Geraldton District to confirm the range extension over 100 km further north.

### References

George (1991).



*Verticordia luteola* A.S.George  
var. *rosea* E.A.George & A.S.George

MYRTACEAE

This variety was described in 1994 after its discovery north of Eneabba by A. Tinker.

It is an upright, slender shrub to 1.5 m. The leaves are obovate and erect, 3-4 mm long on the main stems, and more crowded and spreading and 2-2.5 mm long on the side branches. The flowers are borne in racemes, on short stalks. The hypanthium is deeply three-ribbed and has reflexed green appendages. The sepals are greenish-pink with a silver fringe, becoming lemon-cream, 4.5-5.5 mm long, with 7-8 fringed lobes. The petals are bright pink with a pale pink or white fringe which is further fringed. They are 6-6.5 mm long, the fringe is 3 mm long. There are acute, glandular staminodes, slightly shorter than the stamens. The style is 5-6 mm long with a dense beard for ca. 1 mm.

*Verticordia luteola* var. *rosea* differs from the typical variety in the flower colour, which is pink, not yellow. It flowers later, has slightly larger leaves, a longer petal fringe, and longer stamens and staminodes. It occurs further to the west and south-west of the distribution of *V. luteola* var. *luteola*.

**Flowering Period:** December-January

**Distribution and Habitat in the Moora District**

Known from an area north of Eneabba over a range of ca. 6 km.

It grows in deep white sand in low heath to 1 m with very open low woodland of *Eucalyptus todtiana*, *Banksia attenuata* and *B. menziesii*, associated species including *Allocasuarina humilis*, *Calothamnus* sp. and *Jacksonia* sp.

**Conservation Status**

Current: Priority 1

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Eneabba	I	VCL	25.11.1993	100+	Healthy
2. N of Eneabba	I	VCL	25.11.1993	50+	Healthy

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

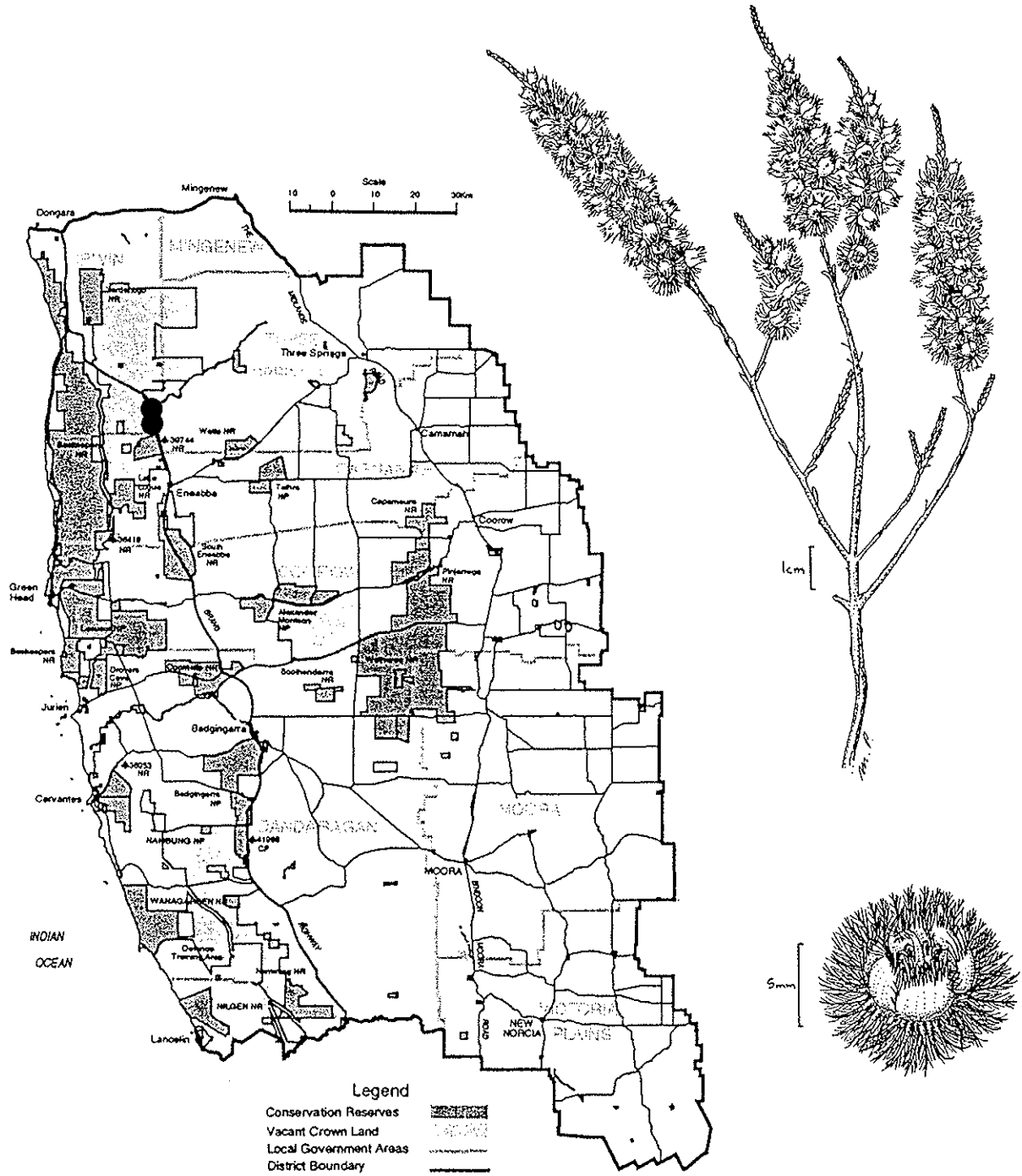
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

**Research Requirements**

- Further survey is required.

References

George (1991), George and George (1994).



● *Verticordia luteola* var. *rosea*

## Spiked Featherflower

The subspecific name means scaly, referring to the small overlapping leaves.

*Verticordia spicata* subsp. *squamosa* is a shrub to 80 cm tall and 1 m wide with a compact, dense habit. The leaves are 1.5-2 mm long, rounded to elliptic, with prominent oil glands. Their margins are irregularly toothed or fringed with hairs less than 0.5 mm long. They are pressed to the stem and closely overlapping. The flowers are closely packed, forming dense spikes on the ends of the branches. They are mauve pink in colour fading to white and are stalkless or with short stalks. The hypanthium is honeycombed with obscure ribs and has 5 green reflexed appendages nearly as long as the tube.

The sepals are 3-4 mm long, fringed and with small basal auricles. The petals are 3 mm long, fringed with fine segments more than 1 mm long. The stamens and staminodes are hairless and the staminodes are linear. The style is 4 mm long, and bearded below the apex.

Differs from *V. spicata* subsp. *spicata* in the smaller leaves and flowers. At the type locality *V. spicata* subsp. *squamosa* grows with *V. comosa* and appears to hybridise with it. The presumed hybrid has spreading leaves 2-3 mm long, a hypanthium with shorter appendages, sepals with prominent auricles and a style 5 mm long with a more dense beard than that of *V. spicata* subsp. *squamosa*. Another presumed hybrid has "offwhite" flowers, with larger sepal auricles and a style beard with longer hairs.

**Flowering Period:** October-December

**Distribution and Habitat in the Moora District**

Occurs between Three Springs and Morawa where it is known in the Moora District from two small populations and three other populations which occur just within the Geraldton District, all within a range of 17 km. Two of the latter populations have not been refound recently.

Grows in tall shrubland, in deep yellow sand. Associated species include *Eucalyptus jucunda*, *Actinostrobus arenarius*, *Jacksonia* sp., *V. comosa*, *V. monadelpha*, *V. densiflora* var. *stelluligera*, *V. eriocephala* and *Grevillea biformis*.

The population on Simpson Road has declined over the last few years from 12 plants to two. These are on a narrow, weedy road verge. Two plants of the hybrid between this subspecies and *V. comosa* are also present.

**Conservation Status**

Current: Priority 1<sup>#</sup>

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Simpson Road	TS	Shire Road Verge	12.1993	2	On narrow, weed infested road verge
2. Drew Road	TS	Shire Road Verge	8.12.1992	3	Partly disturbed
3.* 19 miles from Three Springs towards Morawa	-	-	10.1951	-	-

**Response to Disturbance**

Unknown

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

## Susceptibility to *Phytophthora* Dieback

Presumed susceptible

### Management Requirements

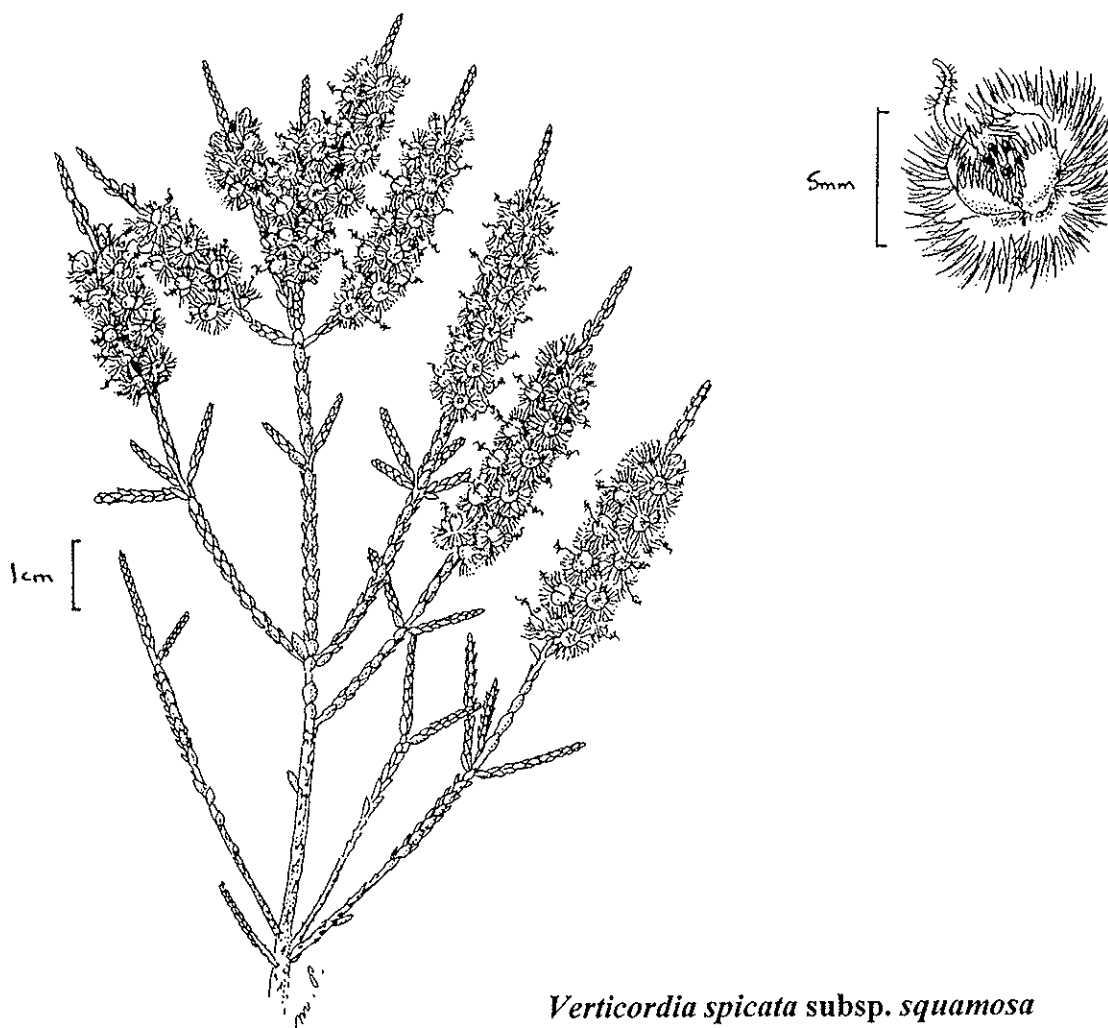
- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that road verge populations are marked.
- Maintain liaison with the Shire.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### Research Requirements

- Further survey is required on remnant native vegetation in the area, and further north-east to re-find population 3.

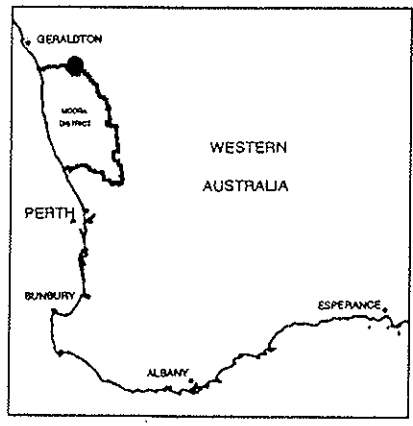
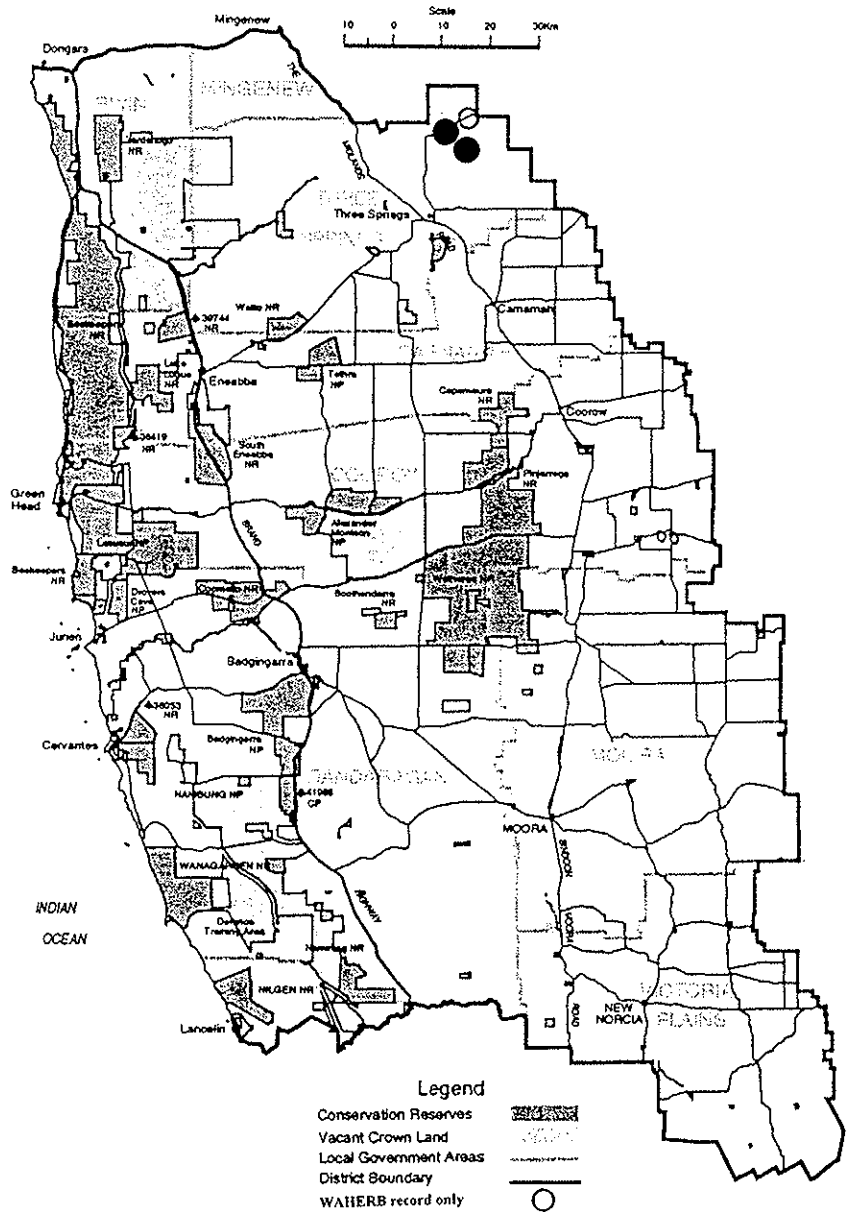
### References

Bentham (1866), George (1991), E. George (personal communication), Mueller (1859).



*Verticordia spicata* subsp. *squamosa*





Locality Map

● *Verticordia spicata* subsp. *squamosa*

## B. Priority Two Taxa

### *Acacia anarthros* Maslin

MIMOSACEAE

This species was originally described as *Acacia drewiana* W.V.Fitzg. subsp. *pungens* Maslin in 1975 but collections of the fruits made in 1976 provided sufficient additional information to raise the taxon to specific rank in 1979.

*A. anarthros* is a dwarf shrub up to 1 m tall. The bipinnate leaves have decurrent leaf axes, each leaf has one pair of pinnae, two to three pairs of pinnules and spiny stipules. The flower heads are globular, about 0.5 cm in diameter with less than 20 flowers per head. The pods are up to 6 cm long with seeds which are dull, minutely roughened and mottled.

This species differs from *A. drewiana* in its single pair of pinnae, the pungent terminal seta and somewhat pungent stipules and the number of flowers in the head.

**Flowering Period:** May-July and September

#### Distribution and Habitat in the Moora District

*A. anarthros* is distributed over a geographic range of 55 km from south of Bindi Bindi to near Bolgart in the Moora District and westward into the Swan Region north of Bindoon. It also occurs near Brookton in the Narrogin District. It is now known from thirteen populations with a total of more than 2000 plants.

It grows beneath open woodland of *Eucalyptus wandoo* and *E. calophylla* in low heath or scrub with *Hakea*, *Dryandra* and *Grevillea* species. It occurs in sand, gravelly loam and gravel.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SE of Moora	Mo	Railway Reserve	3.7.1992	20	Some disturbance
2. Calingiri	VP	Townsite Reserve	13.5.1991	400 est.	Good
3. SW of Calingiri	VP	Shire Road Verge	9.3.1987	2	Healthy
4. N of Bolgart	VP	MRWA Road Verge	29.5.1988	10-20	-
5.*NW of Calingiri	VP	Shire Road Verge	20.9.1983	Occasional-WH	-

#### Response to Disturbance

Responds well to disturbance. Several populations grow on graded road edges, one was noted to have most plants along the edge of a firebreak. Another in the Swan Region had good seedling regeneration after a burn.

#### Susceptibility to *Phytophthora* Dieback

Unknown

#### Management Requirements

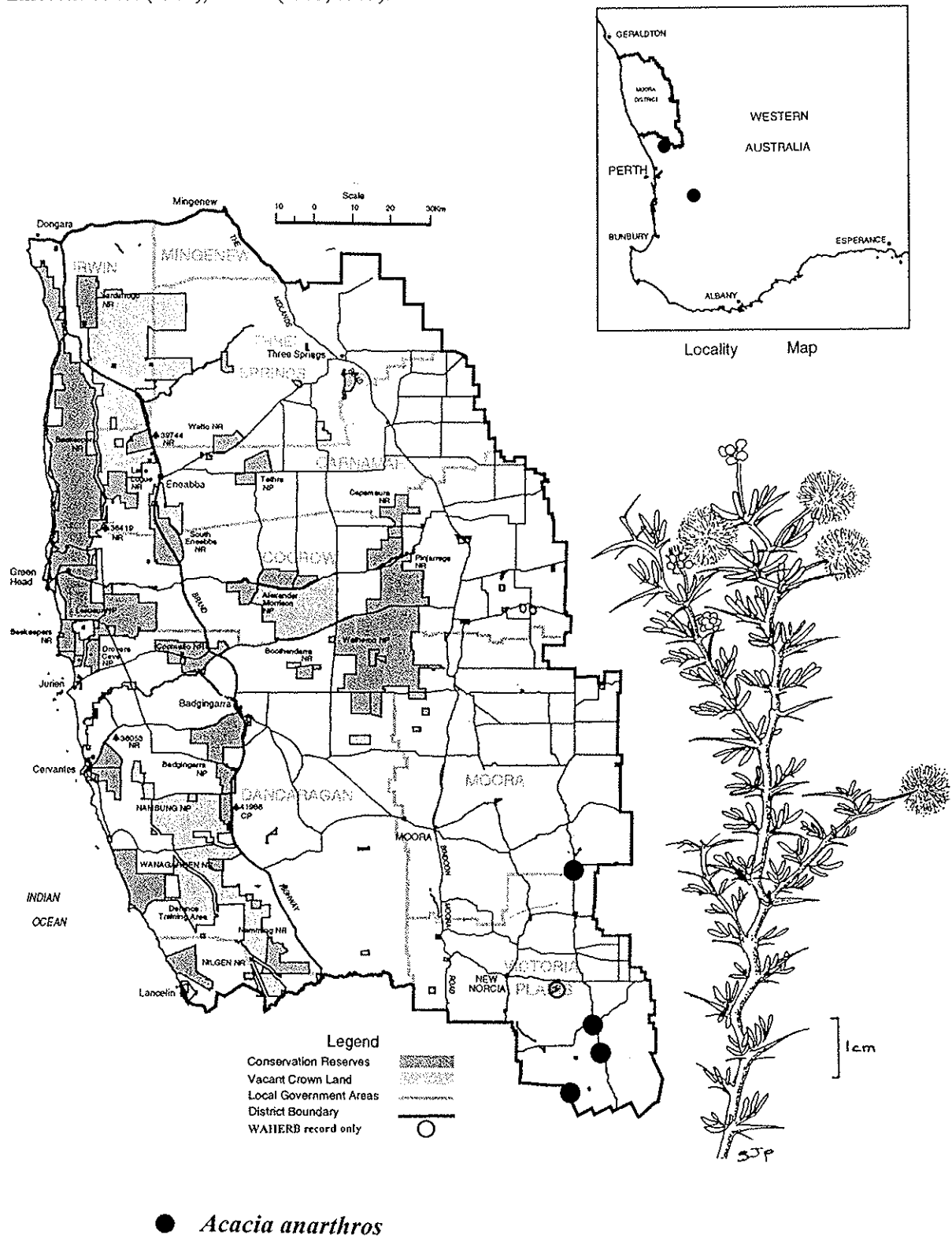
- Ensure that markers are in place at road verge populations.
- Ensure that dieback hygiene procedures are carried out at all populations.

## Research Requirements

- Further survey is required, particularly in the Julimar area north-east of Bindoon, as few populations are known from conservation areas.

## References

Elliot and Jones (1982), Maslin (1975, 1979).



An undescribed species, *Acacia aristulata* ms is a shrub to 1 m tall which may be erect, spreading or decumbent. The stems are slender and usually white. The light to mid-green erect phyllodes have recurved apices and are 7-10 mm long x 2-3.5 mm wide. They may be glabrous or pubescent. The stipules are prominent, 2-3 mm long. The flower heads are creamy-white, 5-6 mm in diameter on peduncles 10-20 mm long. The legumes are constricted between the seeds, loosely once-coiled or irregularly twisted, to 6 cm long and containing elliptic, shiny, grey seeds with a dark nerve.

This species is similar to *A. bidentata* which has hairless phyllodes, smaller heads arranged in racemes and smaller pods with uniformly coloured seeds. It is also similar to *A. rostellata* which has somewhat pungent branchlets, phyllodes with pungent tips, shorter peduncles, smaller heads and black seeds.

**Flowering Period:** September-December

#### **Distribution and Habitat in the Moora District**

Endemic to the Moora District where it occurs on low chert hills. First collected in 1974, this species has been recorded from four localities over a geographical range of ca. 35 km to the north of Moora. It grows on brown loamy sand or clay in rocky ground amongst low scrub. Associated species include *Allocasuarina* species and *Dryandra sessilis*.

#### **Conservation Status**

Current: Priority 2<sup>#</sup>

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Watheroo	Mo	National Park	12.9.1993	30 est.	Disturbed
2. N of Moora	Mo	Rail Reserve	16.10.1991	100 est.	Some weed infestation
3.* N of Moora	Mo	-	1.12.1986	-	-
4.* N of Moora	Mo	Road Verge	8.11.1990	-	-

#### **Response to Disturbance**

Unknown

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

Unknown

#### **Management Requirements**

- Ensure that population on rail reserve is marked.
- Protect populations from fire until fire response is known.
- Inform adjacent landowner of the presence of the population.
- Ensure that dieback hygiene procedures are carried out at all populations.

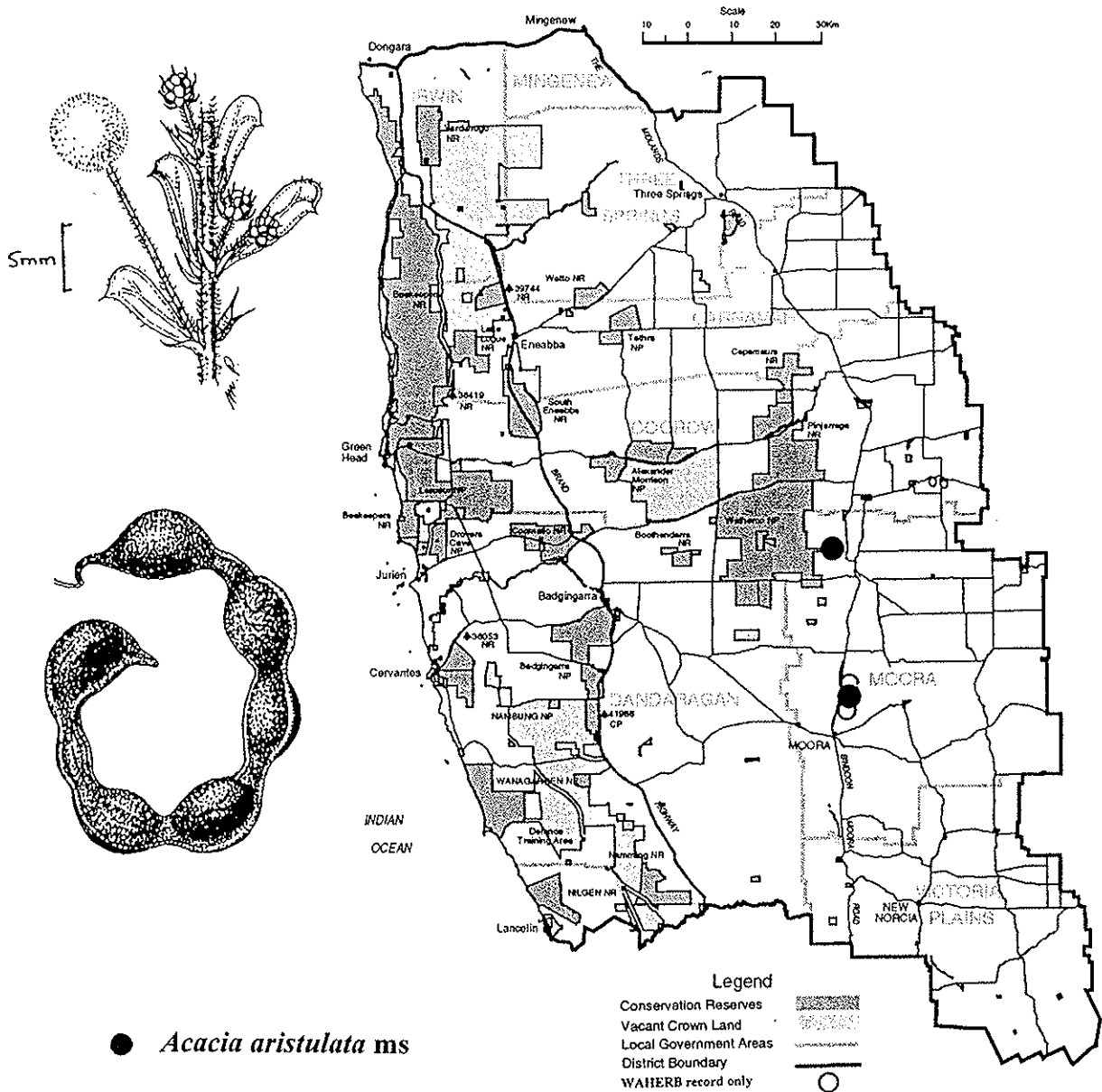
#### **Research Requirements**

- Further survey is required.

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

## References

B. Maslin (personal communication).



This variety of *Acacia browniana* was included as a form of variety *endlicheri* by Maslin in 1975 but was raised to varietal rank by him in 1979.

*A. browniana* var. *glaucescens* is a dwarf, many-stemmed shrub to 30 cm tall, with hairy branches. The plant suckers from subterranean runners. The leaves are bipinnate, with 1-3 pairs of pinnae. The pinnules are oblong, larger than those of var. *endlicheri*, being 6-10 mm long and 3-4 mm wide. They also differ in being flat rather than recurved, glaucous in colour, not green and usually without hairs. The glands on the rachis of the leaves are inconspicuous. The flower heads are globular and yellow in colour. The legumes are larger than those of var. *endlicheri* being up to 45 mm long and 6-9 mm wide. The seeds are dark brown with a yellowish aril.

The glaucous foliage separates this variety from other varieties of *A. browniana*.

**Flowering Period:** August

**Fruiting Period:** October-November

**Distribution and Habitat in the Moora District**

Occurs mainly in the Swan Region around Bindoon over a geographical range of ca. 35 km and has been recorded once from the Moora District in 1929 from Mogumber, extending the known range further north than the main area of distribution. It was not refound in the Moora District during this survey.

Grows in lateritic gravel sometimes with brown loam, in wandoo or jarrah open forest.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* Mogumber	VP	-	8.1929	-	-

**Response to Disturbance**

The plant suckers from subterranean runners.

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

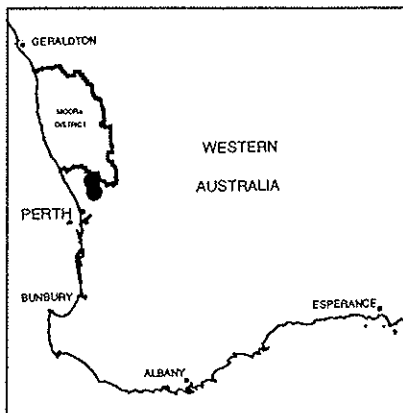
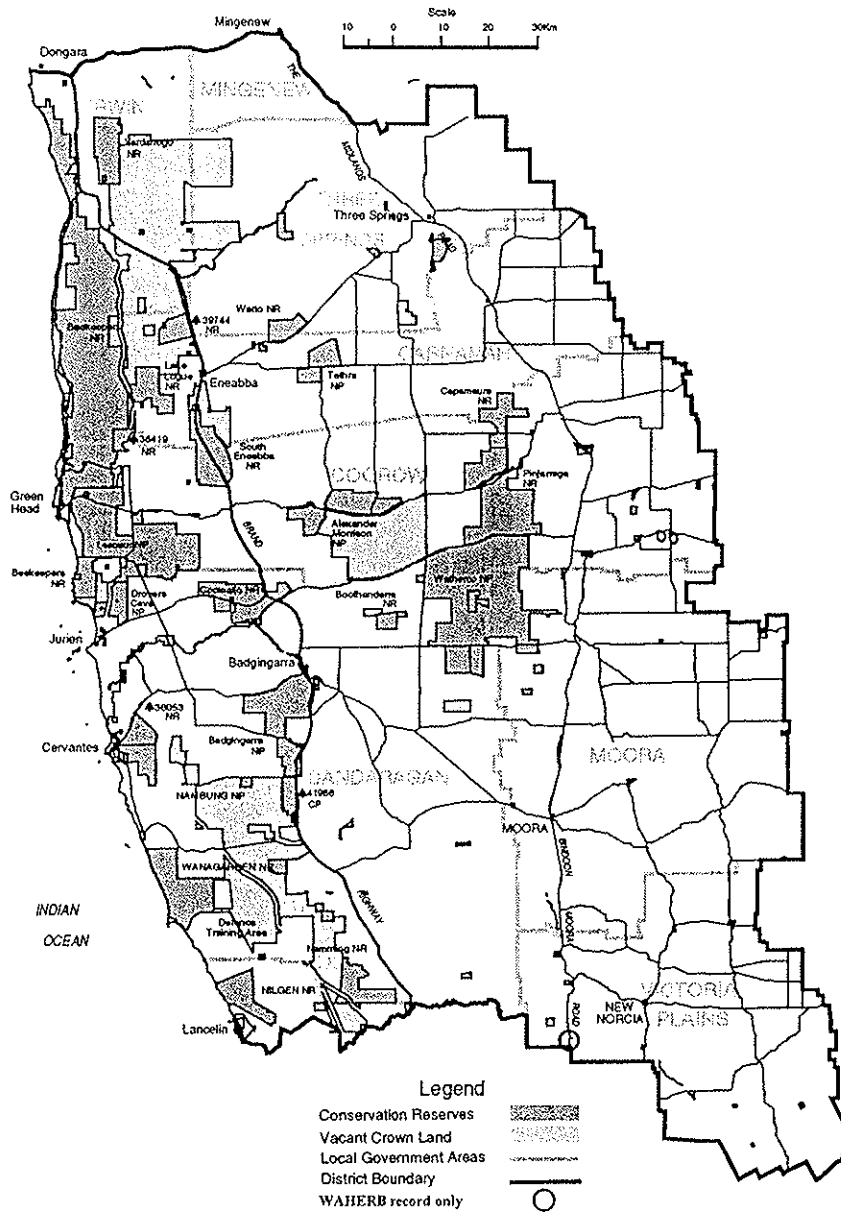
- Ensure that dieback hygiene procedures are carried out at population.

**Research Requirements**

- Further survey is required.

**References**

Elliot and Jones (1982), Maslin (1975, 1979).



Locality Map

● *Acacia browniana* var. *glaucescens*

An undescribed subspecies first collected in 1972 by H. Demarz from west of Three Springs.

*Acacia chapmanii* subsp. *chapmanii* ms is a low dense shrub, divided at the base, 1-1.8 m tall. The phyllodes are spreading or reflexed, terete and pungent pointed, eight-nerved and 2-5 cm long, 0.7-1 mm in diameter. The stipules are persistent and usually spinose. The globular flower heads are golden in colour, 4 mm in diameter and 14-19 flowered, on solitary peduncles 9-19 mm long. The legumes are linear, glabrous and coiled, to 4 cm long, 2.5-3 mm wide, containing longitudinal shiny mottled brown seeds.

Related to *A. acellerata* which has 16-nerved phyllodes, paired peduncles and undulate legumes, and to *A. campylophylla* which has shorter compressed phyllodes which are strongly recurved, and straight, broad, papery legumes with transverse seeds. It is also similar to *A. subsessilis* which has oblongoid flower heads and shorter peduncles and to *A. wilsonii* in phyllode structure. *A. chapmanii* subsp. *australis*, which occurs near Bolgart, has ascending, recurved phyllodes, peduncles 12-19 mm long, non-spinose stipules and flower heads 5 mm in diameter which are 24-27 flowered.

**Flowering Period:** August-September

#### **Distribution and Habitat in the Moora District**

This species is known only from near Three Springs and Marchagee over a geographical range of ca. 65 km.

It grows in sand, laterite and clay loam, in scrub, heath or disturbed areas and sometimes on saline flats, in heath with *Grevillea* species, under open low woodland of *Eucalyptus loxophleba* and *Actinostrobus* species.

#### **Conservation Status**

Current: Priority 2

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Marchagee	Co	Nature Reserve	25.9.1992	50+	Good, gravel extraction nearby
2. SW of Three Springs	TS	MRWA Road Verge	18.8.1993	20+	Disturbed and weed infested
3.* W of Three Springs	TS	-	27.8.1985	-	-
4.* SW of Marchagee	Co	-	29.8.1982	-	-
5.* SW of Marchagee	Co	-	29.11.1982	-	-

#### **Response to Disturbance**

The plants at population 2 are growing in an area which appears to have been extensively disturbed in the past.

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

Unknown

#### **Management Requirements**

- Ensure that population 1 is marked.
- Inform Shire and adjacent landowner of population 2.
- Ensure that nearby gravel extraction does not endanger population 1.



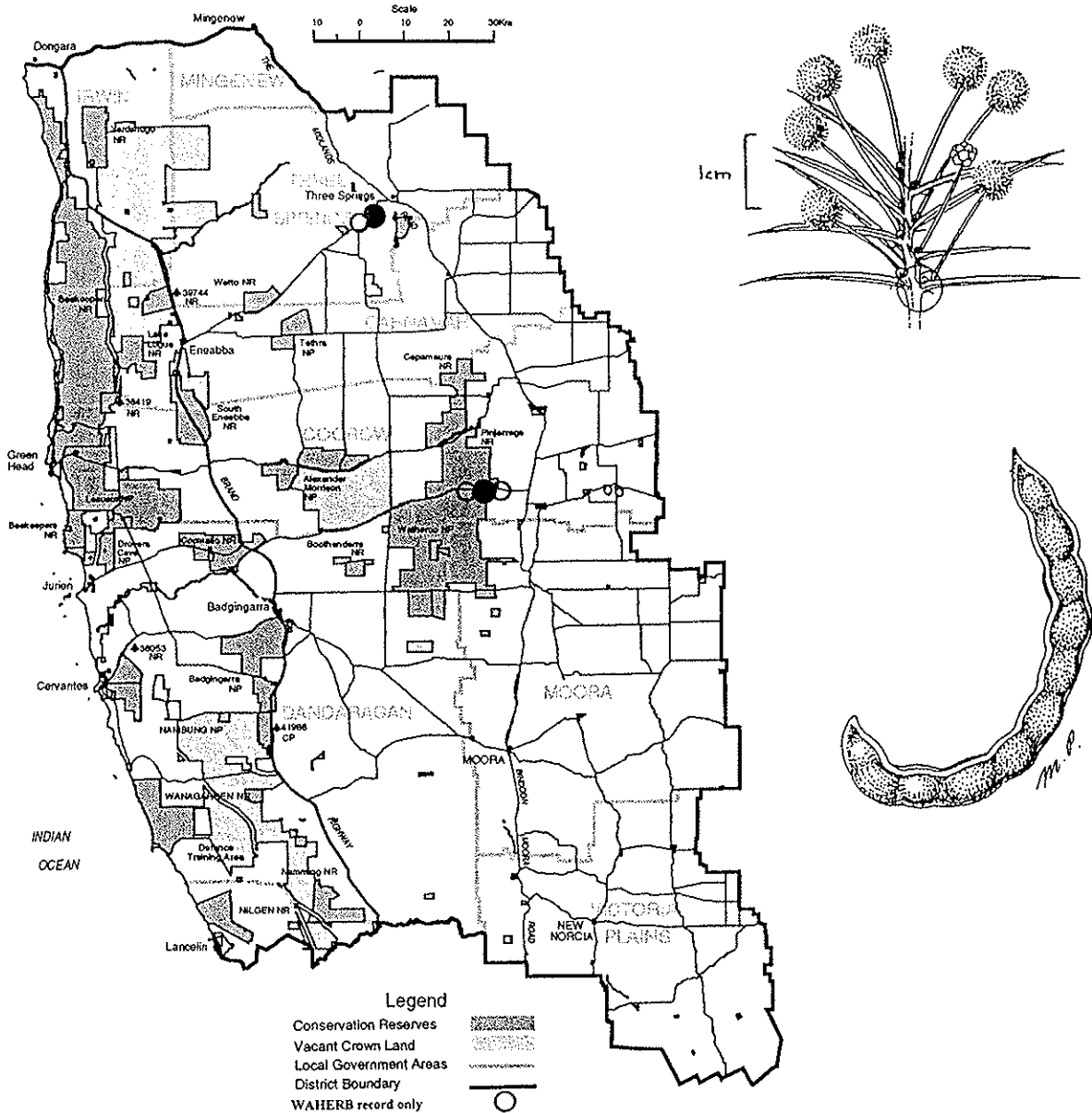
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

**Research Requirements**

- Further survey is required, particularly on the national park and nature reserve around population 2.

**References**

B. Maslin (personal communication).



● *Acacia chapmanii* subsp. *chapmanii* ms

*Acacia dura* was first described by Bentham in 1855 from a collection made by James Drummond. It is a shrub to 1.6 m tall, the young branches with ridges. The erect linear phyllodes are thick and rigid, 2.5-4 cm long and 2-4 mm wide. The globular flower heads are borne on short stalks and are golden in colour. The pods are linear and somewhat constricted between the seeds, to 22 mm long, 3 mm wide containing shiny tan-coloured seeds.

**Flowering Period:** August-September

#### Distribution and Habitat in the Moora District

*A. dura* has been collected from the Wongan Hills to Piawaning area over a geographical range of 30 km, mainly within the Wheatbelt Region where it is known from two populations, of one plant on private land and 33 plants on a shire road verge. There has been one collection from within the Moora District, north of Yerecoin. The species was not refound in the Moora District during this survey.

It is recorded growing in sand in heath or clay and clay loam soils with *Melaleuca uncinata*, *Calothamnus aspera* and *Allocasuarina campestris*.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.*N of Yerecoin	VP	-	21.8.1957	-	-

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Unknown

#### Management Requirements

- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

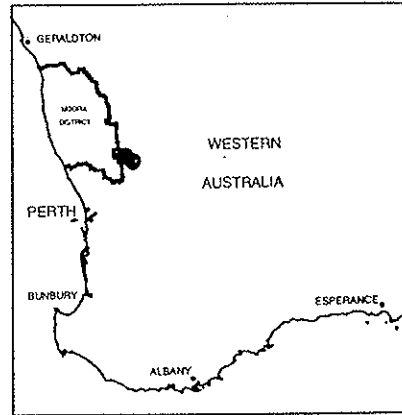
#### Research Requirements

- Further survey is urgently required throughout the range of the species, particularly on nature reserves and in the Wongan Hills to refind earlier recorded populations, most of which have not been seen for more than ten years.

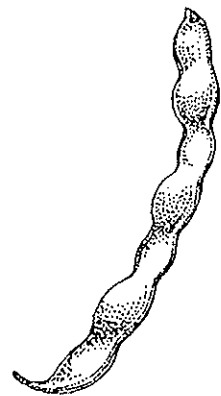
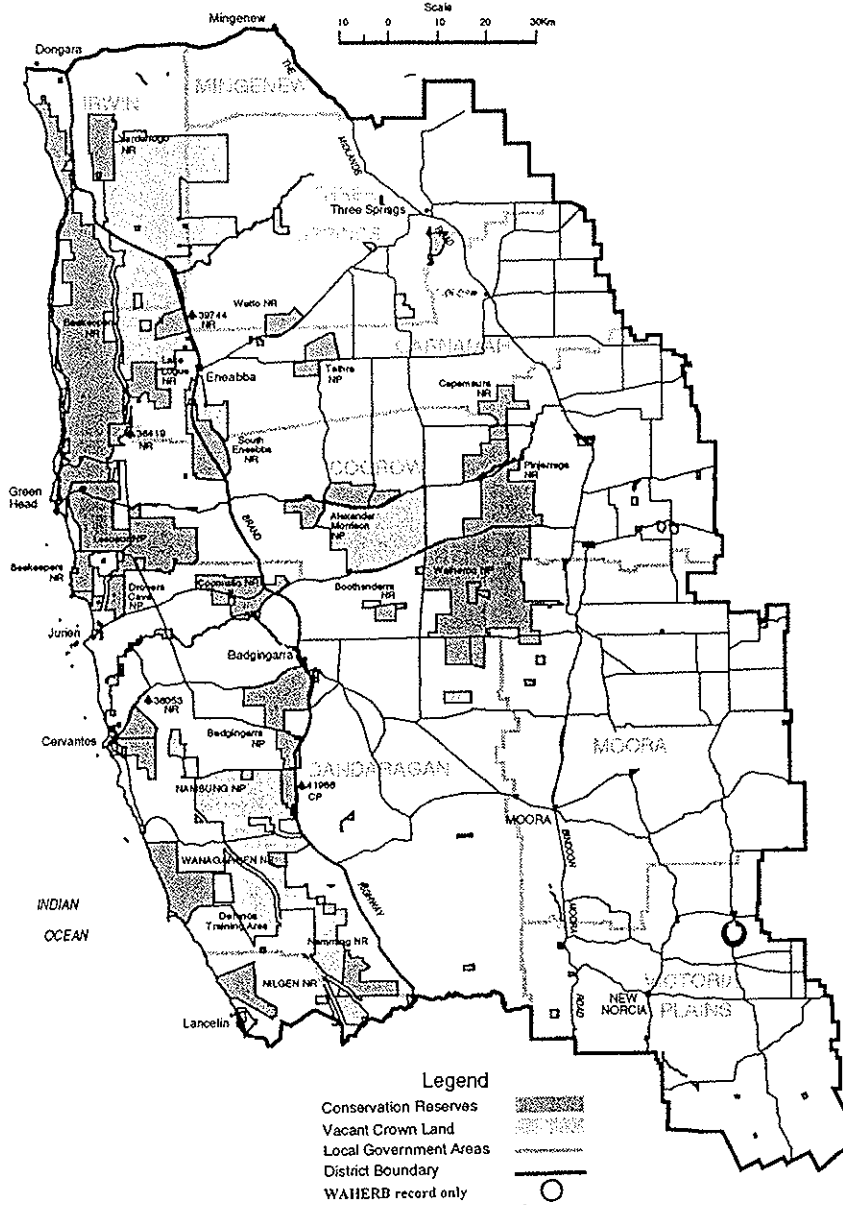
#### References

Bentham (1855, 1864), Blackall and Grieve (1974), B. Maslin (personal communication), Rye (1980).

● *Acacia dura*



Locality Map



***Acacia lasiocarpa* Benth.**  
**var. *lasiocarpa* Cockleshell Gully variant (E.A.Griffin 2309)**

MIMOSACEAE

A compact, erect shrub to 50 cm tall. Axillary spines are present at most nodes, one per node, and are 3-12 mm long. The leaves are bipinnate with one pair of pinnae and 5-8 pairs of recurved pinnules, narrowly oblong, 3-5 mm long. The peduncles are 6-12 mm long and the bracteoles have long narrow points. The flower heads are globular, 5-7 mm in diameter and the flowers are yellow. The pod is compressed, narrowly oblong, little constricted between the seeds, 10-40 x 3-5 mm.

This variety has conspicuously hairy branchlets, 5-8 pairs of pinnules 3-5 mm long rather than 2-6 pairs 1-4 mm long and bracts which are long and narrow rather than short and pointed.

Currently recognised as an informal variant.

**Flowering Period:** August-September

**Distribution and Habitat in the Moora District**

Known from only two collections made from the Lesueur area where it was recorded growing in grey-yellow sand with lateritic gravel on the slope of a breakaway in low open heath.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.*Cockleshell Gully	D	National Park	29.8.1979	-	-
2.*Mt Lesueur	D	National Park	27.10.1973	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

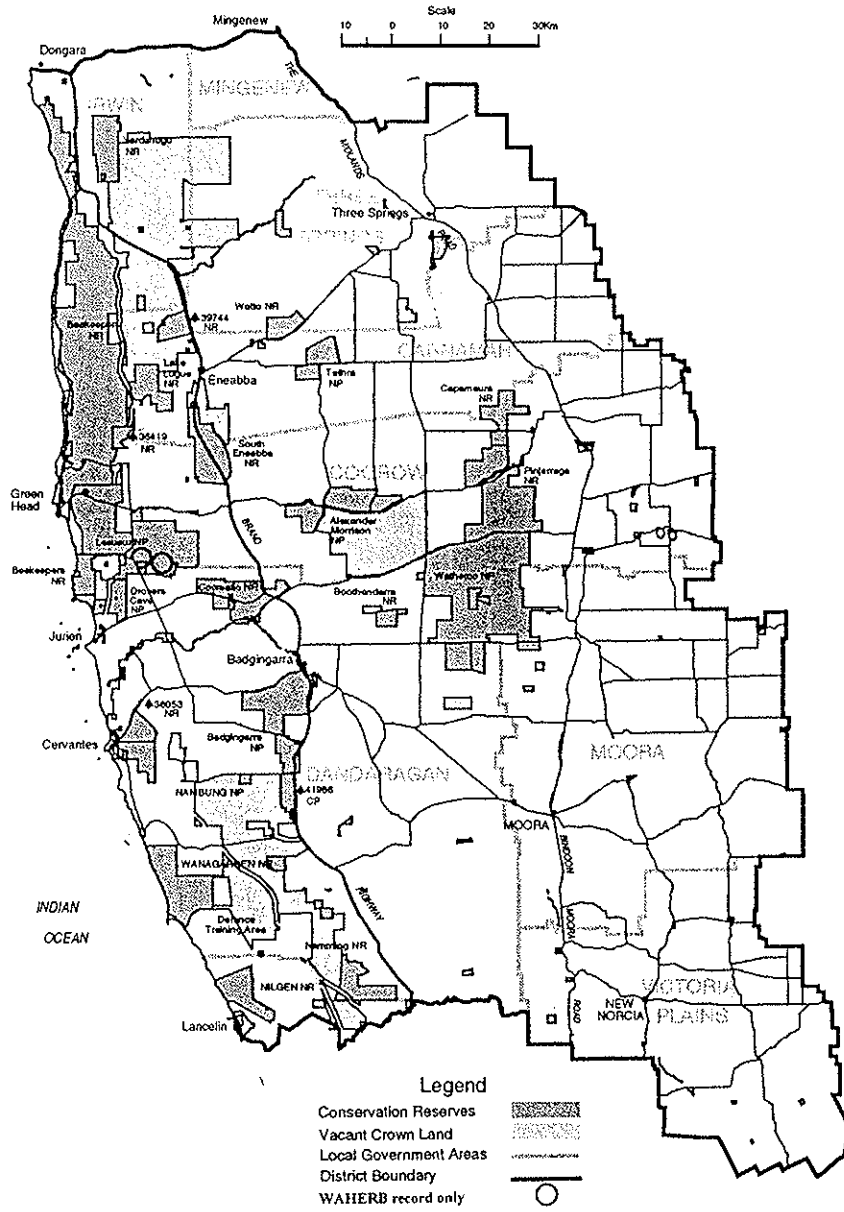
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required, particularly in the Lesueur National Park, to refine the original populations and to establish the full extent of the populations in the area.

**References**

Marchant *et al.* (1987), B. Maslin (personal communication).



*Acacia lasiocarpa* var. *lasiocarpa* Cockleshell Gully variant (E.A.Griffin 2039)

This species was described in 1975 by Maslin, from collections made in 1949 by Charles Gardner. The specific name refers to the pleated shape of the legumes.

*Acacia plicata* is an erect open shrub to 1.5 m tall, with densely hairy branches and leaves. The leaves are bipinnate and there are glands on the pinnae rachides. The stalks of the flower heads are 1-3 cm long with short hairs. The flower heads are globular, yellow in colour, with long white spreading hairs on the bracteoles and the calyx lobes of the individual flowers which are conspicuous on the buds. The pods are pleated, with up to 8 folds and are 1-2 cm long, 5 mm wide. A variant in the Lesueur area has a low straggling habit to 30 cm tall and glabrous flower head stalks.

**Flowering Period:** August-October, with young fruits occurring in October, maturing in mid-November, but some may be retained undehisced on the plant until March.

#### Distribution and Habitat in the Moora District

A species endemic to the Moora District, occurring in the Hill River and Cataby areas over a geographical range of 75 km.

It grows in brown or grey-brown clayey loam, sometimes with lateritic gravel or over sandstone and siltstone, in open heath beneath woodland of *Eucalyptus wandoo*, with *E. calophylla* and *E. loxophleba*. It is usually found along watercourses.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Lesueur	D	National Park	6.10.1991	30+	Partly disturbed
2. E of Jurien	D	Road Verge, Private	22.9.1992	200+	Disturbed
3. Lesueur	D	Private	8.3.1991	50 est.	Undisturbed
4. NE of Jurien	D	MRWA Road Verge, Private & Education Reserve	14.8.1991	30+	Partly disturbed
5. Cataby	D	MRWA Road Verge	15.8.1991	30	Partly disturbed
6.* E of Cataby	D	Private	15.9.1988	-	-
7.* E of Mt Lesueur	D	National Park	5.9.1979	-	-

#### Response to Disturbance

Some populations occur in disturbed areas and may benefit from open conditions.

#### Susceptibility to *Phytophthora* Dieback

Unknown

#### Management Requirements

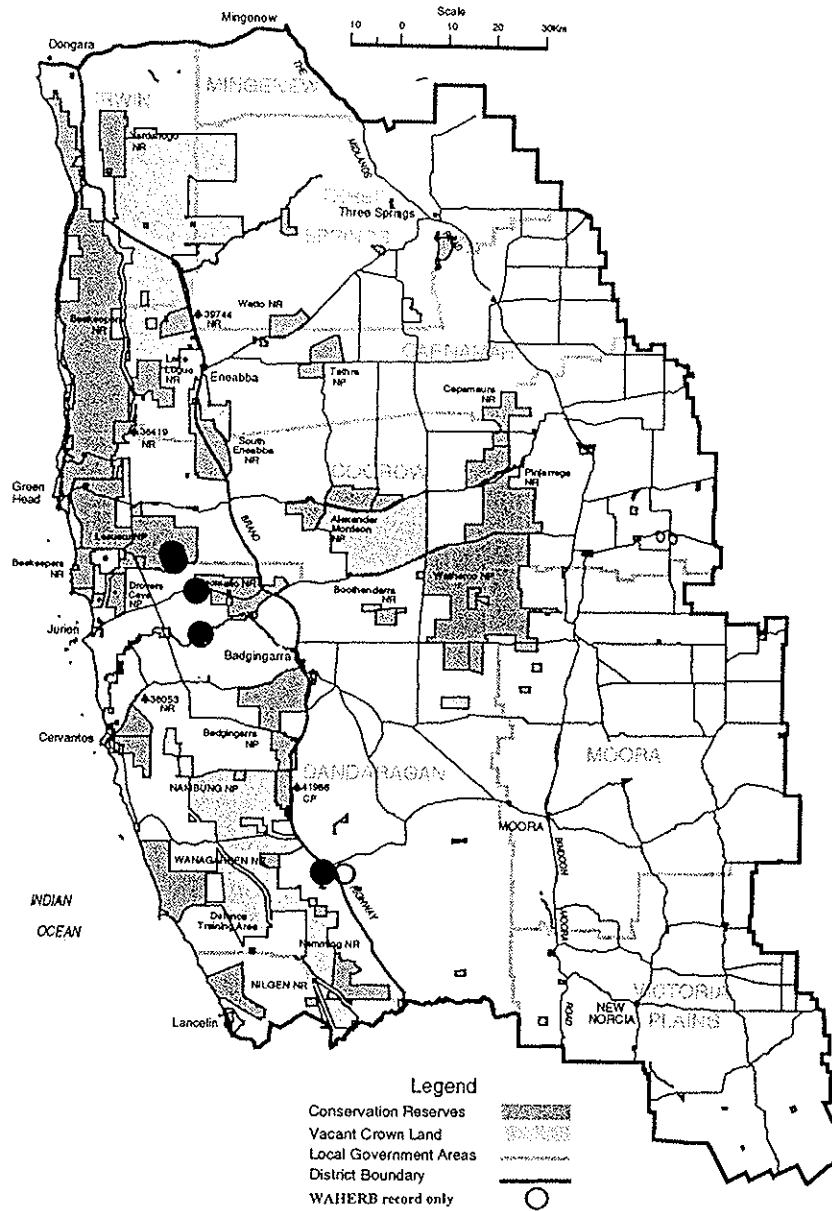
- Ensure that all road verge populations are marked.
- Maintain liaison with landowners and managers.
- Ensure that dieback hygiene procedures are carried out at all populations.

## Research Requirements

– Further survey is required.

## References

Elliot and Jones (1982), Maslin (1975).



● *Acacia plicata*

*Acacia recurvata* R.S.Cowan & Maslin ms

MIMOSACEAE

[*Acacia* sp. Coorow (B.R.Maslin 6580)]

This undescribed species was first collected from east of Coorow in 1977 by Charles Chapman and was only known from this population until another was discovered during this survey.

*Acacia recurvata* ms is a domed shrub to 2.5 m tall, with angular resinous branches which become terete and minutely hairy with age. The phyllodes are unequal, narrow elliptic in shape, with the upper margin more curved. They are held upright and are 3-4 cm long, 5-7.5 mm wide and leathery in texture, grey-green in colour. The flower heads are in pairs and are globular and golden in colour, to 5 mm in diameter. The pods are linear, to 6 cm long, 4 mm wide.

**Flowering Period:** June-July. Young pods have been collected in September.

**Distribution and Habitat in the Moora District**

Known from two populations over a geographic range of 45 km in the Three Springs-Coorow area. Grows in sandy clay and granitic clay-loam in *Melaleuca uncinata* shrubland on or near breakaways.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Three Springs	TS	Nature Reserve	22.10.1992	70+	Good
2. N of Coorow	Ca	Shire Road Verge, Private	19.9.1991	100 est.	Partly disturbed

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

- Ensure that road verge population is marked.
- Maintain liaison with landowner and Shire.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

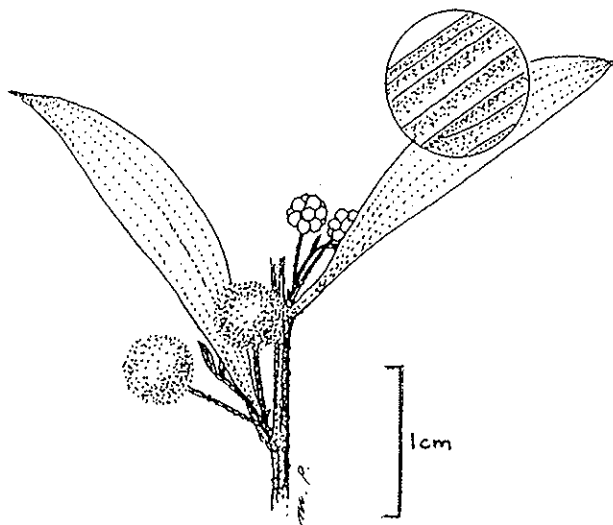
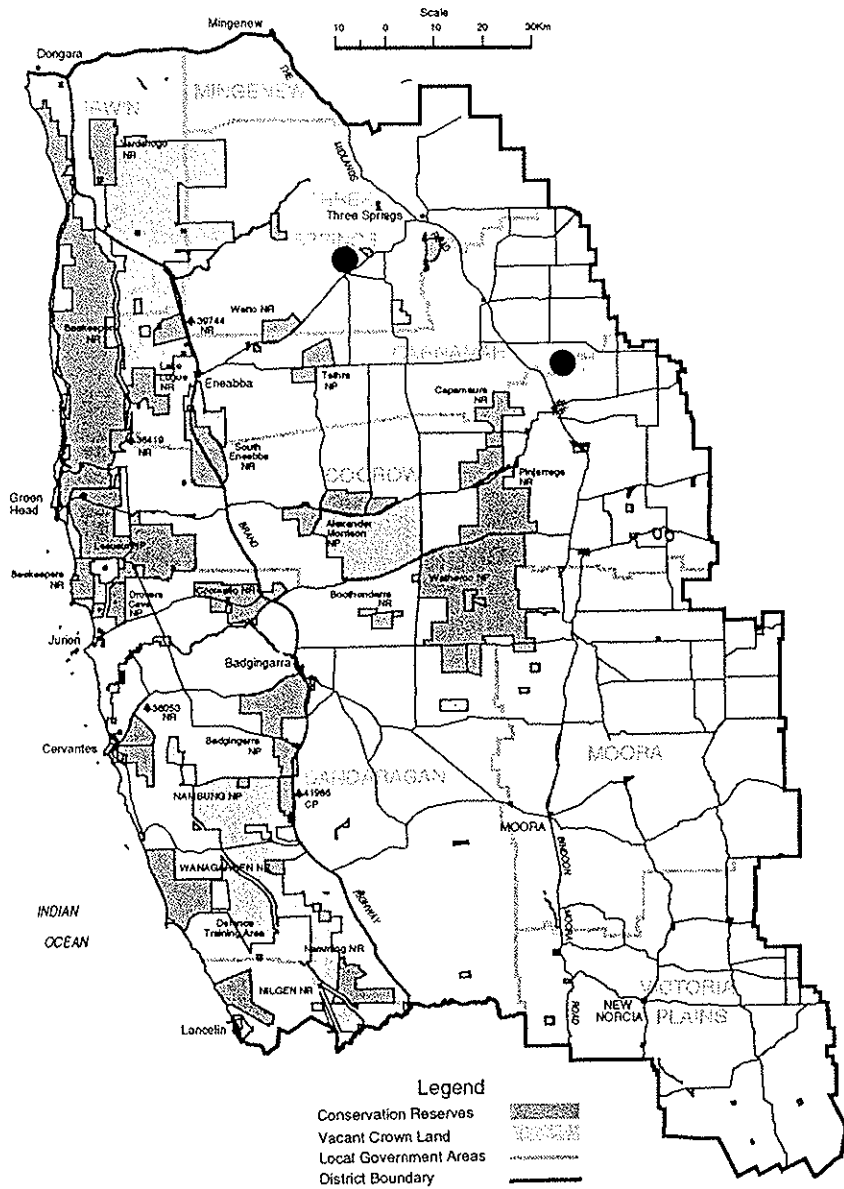
**Research Requirements**

- Further survey is required.

**References**

R. Cowan and B. Maslin (personal communication).





● *Acacia recurvata* ms

*Acacia retrorsa* was first described in 1855 by Meisner from material collected by James Drummond from between the Moore and Murchison Rivers. In 1864 it was described by Bentham as *A. sphacelata* var. *retrorsa* (Meisner) Benth. The specific name refers to the phyllodes which point backwards on the stems.

*A. retrorsa* is a prostrate sprawling shrub to 1.5 m tall and 2 m in diameter. The phyllodes are linear, terete to flat, without stems, and with pungent points. They are usually held reflexed on the stems. The flower heads are globular, light golden in colour, about 0.5 cm in diameter. The pods are twisted, hairless and dark brown in colour, to 6 cm long, 3.5 to 4.5 mm wide and restricted between the seeds.

This species is similar in appearance to *A. sphacelata* which has spreading or upright phyllodes and hairy pods.

**Flowering Period:** August-September. Mature pods have been collected in November.

#### Distribution and Habitat in the Moora District

Endemic to the Moora District and known from between Jurien and Eneabba over a geographic range of 35 km.

Grows in low open heath or low open woodland of *Eucalyptus wandoo* and *E. loxophleba* or *E. calophylla* in sand or sandy loam, sometimes with lateritic gravel, usually low in the landscape.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SE of Mt Lesueur	D	Shire Road Verge	18.11.1992	2	Disturbed
2. E of Jurien	D	Shire Road Verge	22.9.1992	20+	Disturbed and weed infestation
3. N of Mt Benia	D	Shire Road Verge, Education Reserve	14.8.1991	60+	Partly disturbed
4. SW of Mt Lesueur	D	National Park	1993	3	On track alignment
5.*NE of Mt Lesueur	D	National Park	12.11.1979	-	-
6.*Mt Lesueur	D	National Park	21.8.1949	-	-
7.*N of Coorow-Greenhead Road	Co	-	2.9.1979	-	-
8.*Cockleshell Gully	D	-	9.1938	-	-

#### Response to Disturbance

At population 1, the plants were growing on a scraped road verge, producing vigorous prostrate growth with stems to 2 m in length, the plants reaching to 4 m in diameter.

#### Susceptibility to *Phytophthora* Dieback

Unknown

#### Management Requirements

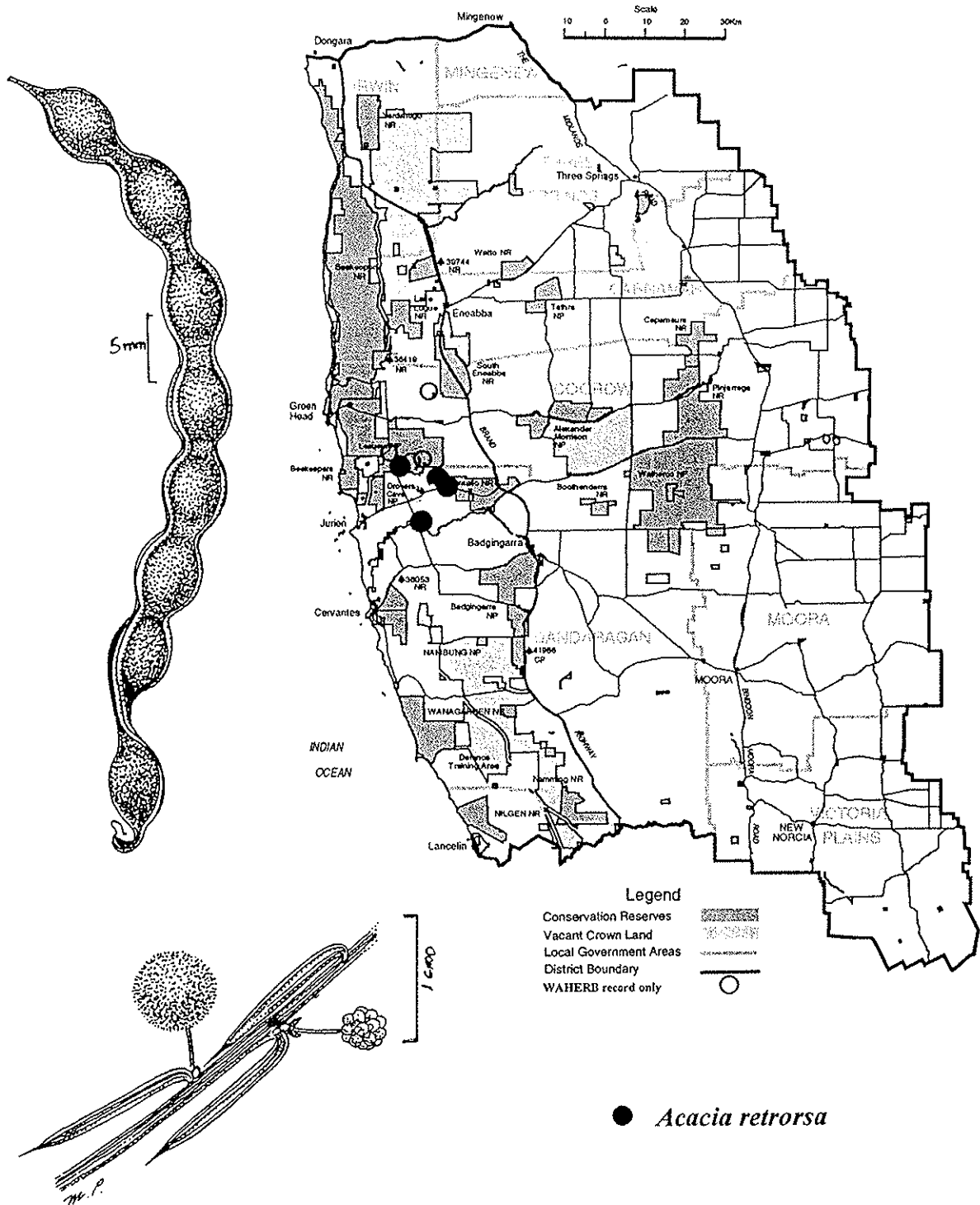
- Ensure that markers are in place at road verge populations.
- Maintain liaison with Shire.
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required to refind populations 5-8 and to survey fully and to determine the full extent of the species in the area.

**References**

Bentham (1864), B. Maslin (personal communication), Meisner (1855).



This species was described in 1992. It was first collected in 1948 when it was identified as *Acacia perryana*.

*A. telmica* is a dense rounded shrub, to 1-3 m tall, and 1.5-5 m wide. The young growth, branchlets and raceme axes have spreading hairs. The phyllodes are elliptic and obtuse, usually 2-nerved, 2-4 cm long, 8-20 mm wide, dark green in colour. The racemes are 15-25 mm long, with 3-5 flower heads which are globular and golden, borne on peduncles 6-10 mm long which occur singly along the raceme axis. The legumes are ca. 5 cm long, 4-5 mm wide, containing grey-brown seeds with an orange or cream aril.

*A. telmica* is distinguished from *A. rostellifera* and *A. xanthina* by the dimensions of the phyllodes and by the spreading hairs. *A. startii*, which occurs further north, has these characters but differs in its coiled, more narrow legumes.

**Flowering Period:** July-September

#### Distribution and Habitat in the Moora District

This species occurs in two areas in the Moora District, to the east of Dongara and west of Eneabba, over a geographic range of ca. 80 km.

It grows in sand, loam and loamy clay in low-lying seasonally moist areas, in shrubland or woodland.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Eneabba	Ca	?Nature Reserve	27.8.1992	1	Undisturbed
2. SE of Irwin	I	Shire Road Verge	11.7.1991	100+	Weed invasion
3. SE of Irwin	I	Shire Road Verge	11.7.1991	2	Disturbed
4. SE of Irwin	I	Shire Road Verge	11.7.1991	16	Disturbed
5. SE of Irwin	I	Shire Road Verge	11.7.1991	40 est.	Disturbed, sheep driven along verge
6. SW of Eneabba	Ca	MRWA Road Verge	11.7.1991	40+	Good, some weed invasion

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Unknown

#### Management Requirements

- Ensure that road markers are in place at all road verge populations.
- Determine the land status of population 1.
- Maintain liaison with the Shires.
- Ensure that dieback hygiene procedures are carried out at all populations.

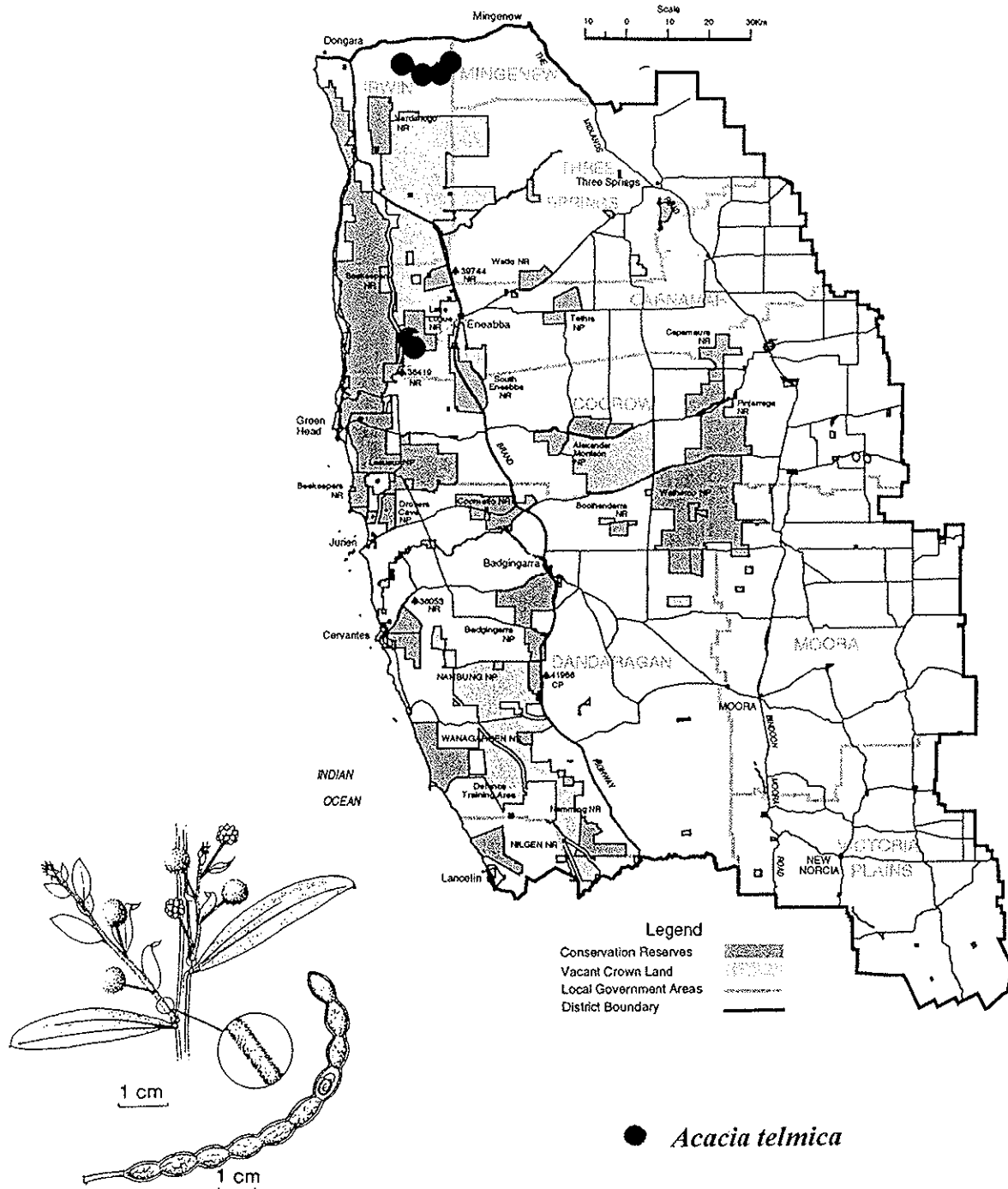
## Research Requirements

- Further survey is required.

## References

Chapman and Maslin (1992).

Illustration by J. Rainbird.



This species was first collected in 1965 by Paul G. Wilson and three subsequent collections were made with flower buds and fruits. Flowering material was not collected until December 1992.

*Acacia wilsonii* ms is a low shrub to 30 cm tall with horizontal branches bearing terete erect phyllodes which are sessile, continuous on the branchlets and up to 13 cm long. The flower heads are globular, golden yellow in colour, with stalks about 1 cm long. The flowers have united sepals. The legumes are linear, subterete, to 5.5 cm long, containing oblong dull brown seeds.

*A. wilsonii* ms is most closely related to *A. ridleyana* which has flat phyllodes which are clearly differentiated from the branchlets and which have a pulvinus. *A. campylophylla* and *A. chapmanii* also have phyllodes continuous on the branchlets and without a pulvinus but both have free sepals and petals and the former has flat phyllodes. *A. aciphylla* differs in its phyllodes which are rhombic in transverse section with numerous nerves.

**Flowering Period:** February

#### **Distribution and Habitat in the Moora District**

Known only from the Moora District from a few collections made between Eneabba and Dandaragan over a range of 60 km. Only one population has been found recently.

Grows in white or yellow sand with lateritic gravel in low heath on the shoulder of lateritic upland. Associated species include *Hakea spathulata*, *Gastrolobium spinosum*, *Allocasuarina campestris* and *Calothamnus quadrifidus*.

#### **Conservation Status**

Current: Priority 2

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. E of Eneabba	Ca	MRWA Road Verge	19.8.1993	20 est.	Undisturbed
2.*N of Badgingarra	Co	National Park	24.10.1982	-	-
3.*N of Badgingarra	D	-	2.11.1965	-	-

#### **Response to Disturbance**

Unknown

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

Unknown

#### **Management Requirements**

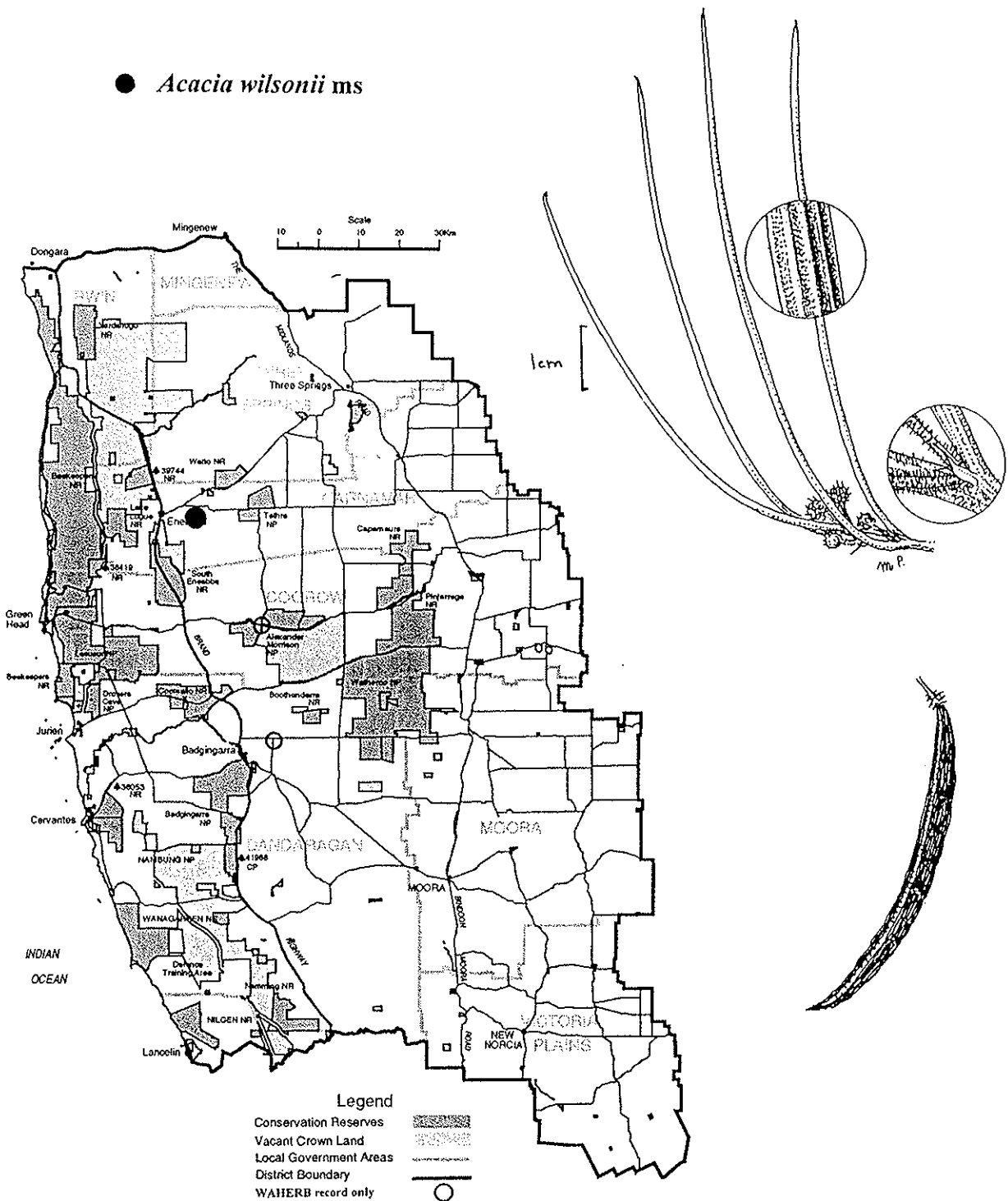
- Ensure that road markers are in place at population 2.
- Liaise with MRWA and the Shire to ensure that population 2 is not damaged by road work.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

## Research Requirements

- Further survey is required in February to refind populations 2 and 3 and to find further populations. The species is inconspicuous when not in flower and has a summer flowering period, so may be more common than appears at present.

## References

R. Cowan and B. Maslin (personal communication).



This species was first described by de Candolle in 1839 from material collected by James Drummond.

It is a slender shrub, usually upright, up to 50 cm tall, sometimes with decumbent branches. The leaves are narrow, with erect or incurved, keeled tips, up to 5 mm long, 1.5 mm wide at the base. The flowers are white, pink, pale mauve or lilac, in dense terminal heads. The sepals are 7-9 mm long, exceeding the petals, style and stamens in length. The corolla has lobes which are densely bearded to the tip and which are as long as the tube.

**Flowering Period:** September-November

#### **Distribution and Habitat in the Moora District**

Has been recorded from two localities in the metropolitan area over a range of ca. 5 km and from three localities in the Moora District over ca. 15 km. These disjunct populations are ca. 160 km apart.

The species has been recorded from a winter-wet area in the metropolitan area and in the Moora District from seasonally damp black sandy clay flats near swamps or in white sand over nodular ironstone. Associated vegetation has been recorded as open low heath with *Calothamnus hirsutus*, *Verticordia densiflora* and *Kunzea recurva*, or heath over sedges.

#### **Conservation Status**

Current: Priority 2<sup>#</sup>

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* E of Nambung	D	?Nature Reserve	15.10.1984	-	-
2.* NW of Cataby	D	VCL	6.11.1988	-	-
3.* SSE of Cervantes	D	VCL	22.11.1992	-	-

#### **Response to Disturbance**

Unknown

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

Presumed susceptible

#### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

#### **Research Requirements**

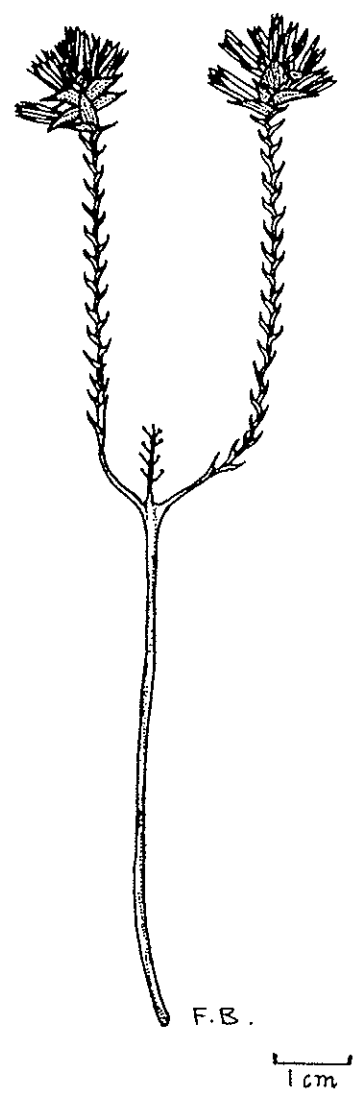
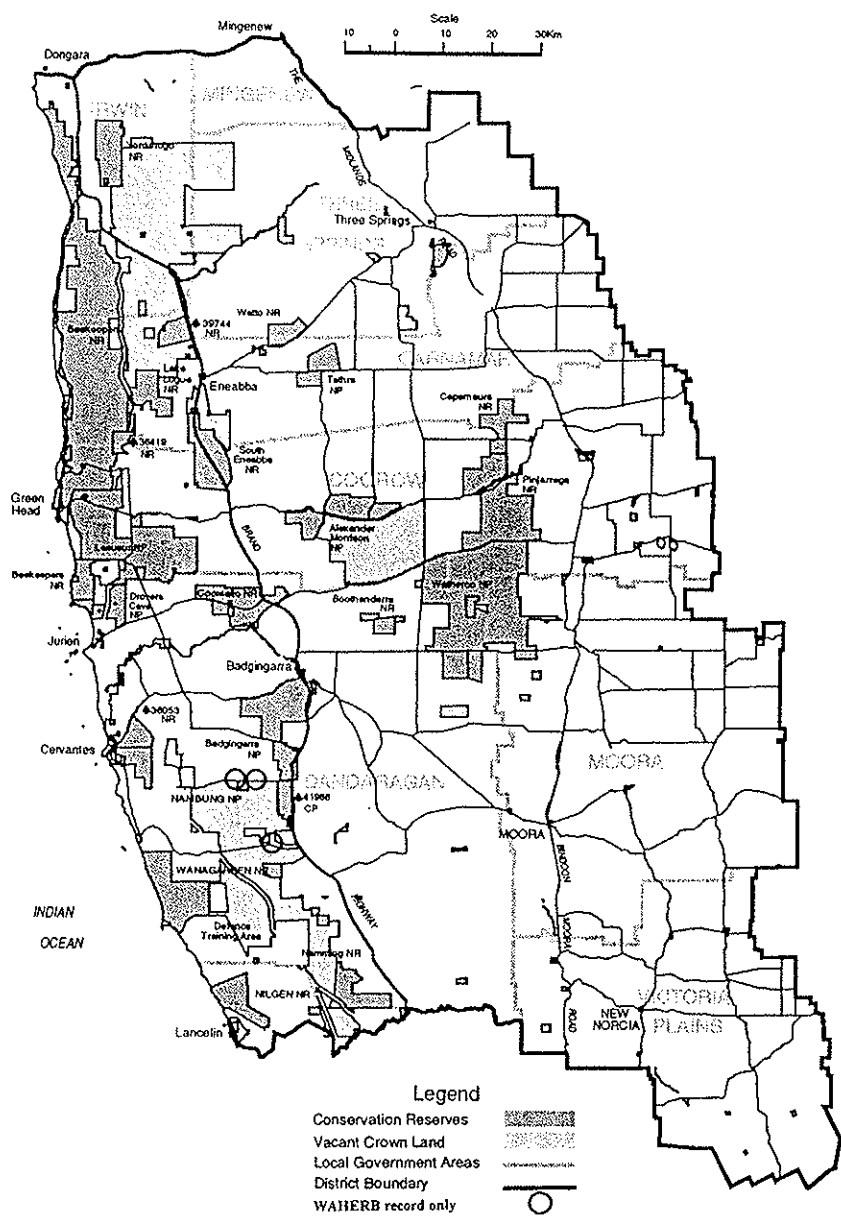
- Further survey is required to re-find all known populations and survey fully, and to find new populations.

#### **References**

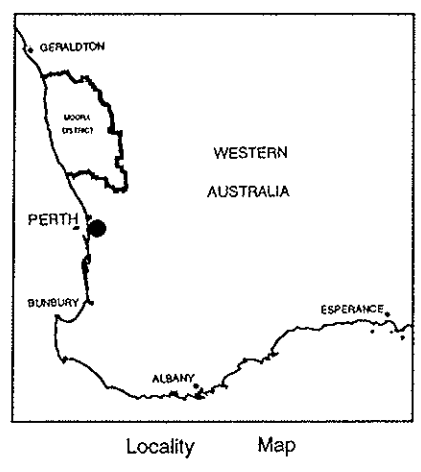
Bentham (1869), de Candolle (1839), Watson (1962).

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





● *Andersonia gracilis*



*Anigozanthos humilis* Lindl. subsp. *grandis* Hopper ms

HAEMODORACEAE

Giant Catspaw

An undescribed subspecies which was identified as early as the 1840s by James Drummond.

An upright plant with flat, curved leaves up to 24 cm long and flowering stems up to 100 cm long. The flowering stems bear a single flower cluster, although sometimes a second smaller flowering stem is produced from one of the lower stem leaves. The hairy flowers are ca. 25 mm long, yellow and orange in colour. The flower tube is slightly curved and the lobes are slightly reflexed. The stamens are inserted at three levels on the flower tube.

This subspecies is distinguished from the typical subspecies by the taller flowering stems and longer leaves.

**Flowering Period:** September-November

**Distribution and Habitat in the Moora District**

Has been found in the Moora District in the Cataby area over a geographic range of 20 km but is also known from the Swan Region west of Gingin 65 km further south.

Grows along creeks and near swamps in open wandoo or marri woodland on sandy clay loam soils. Associated species include *Beaufortia*, *Xanthorrhoea* and *Calothamnus* species.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

---

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. W of Dandaragan	D	Nature Reserve	26.9.1991	50 est.	Undisturbed but some weed infestation
2. SW of Dandaragan	D	Shire Road Verge, Private	26.9.1991	200+	Some weed invasion and disturbance
3. S of Badgingarra	D	Recreation Reserve	26.9.1991	10+	Undisturbed
4. NW of Dandaragan	D	Private	1992	>200	Undisturbed

---

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

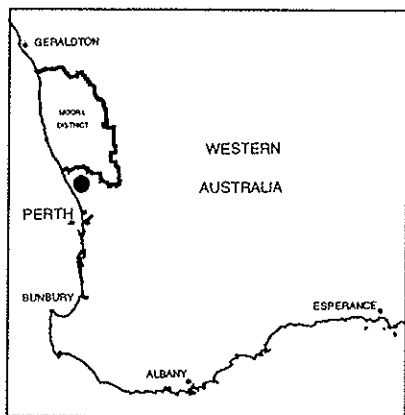
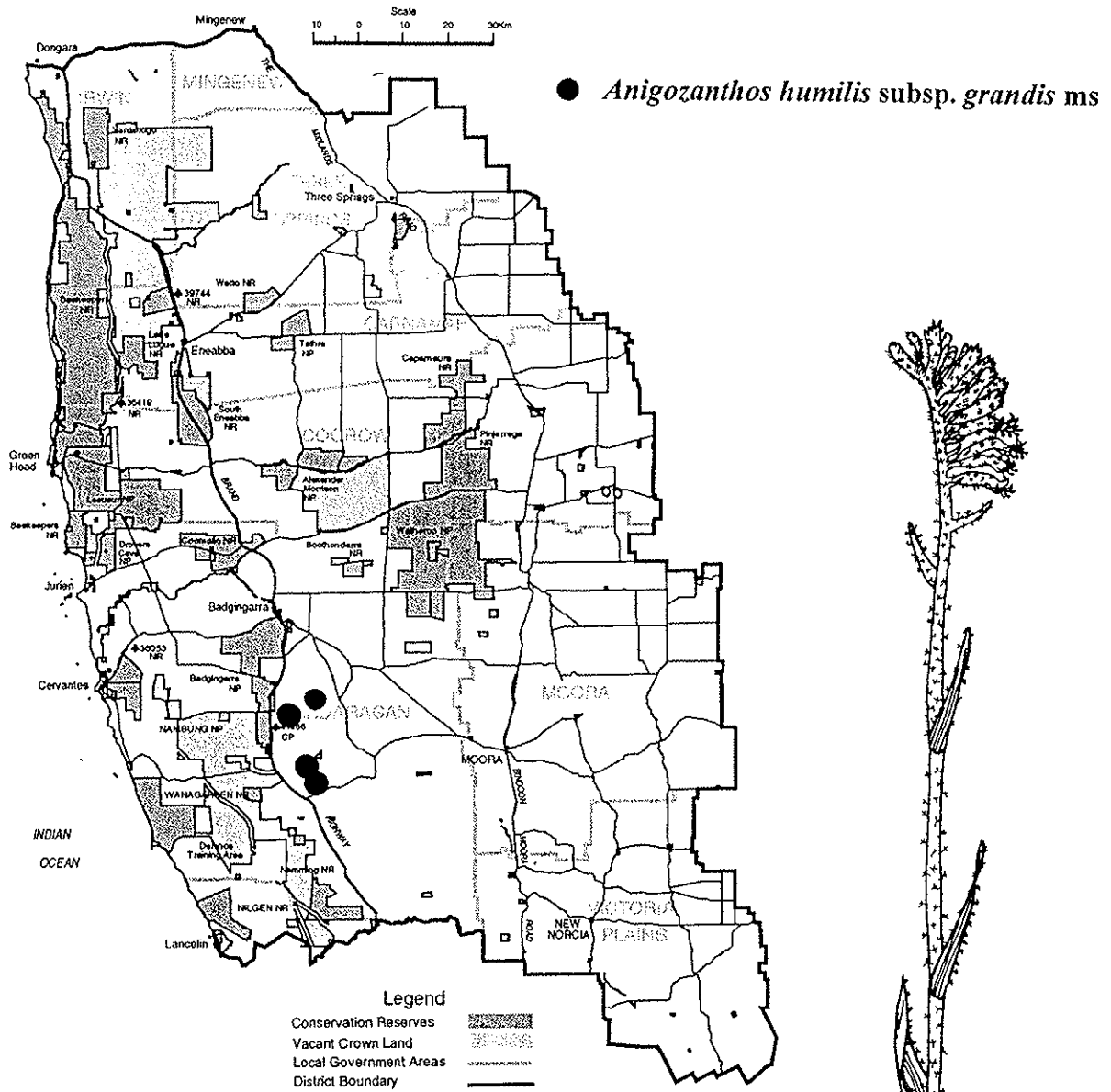
- Ensure that road verge population is marked.
- Maintain liaison with Shire and landowners.
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

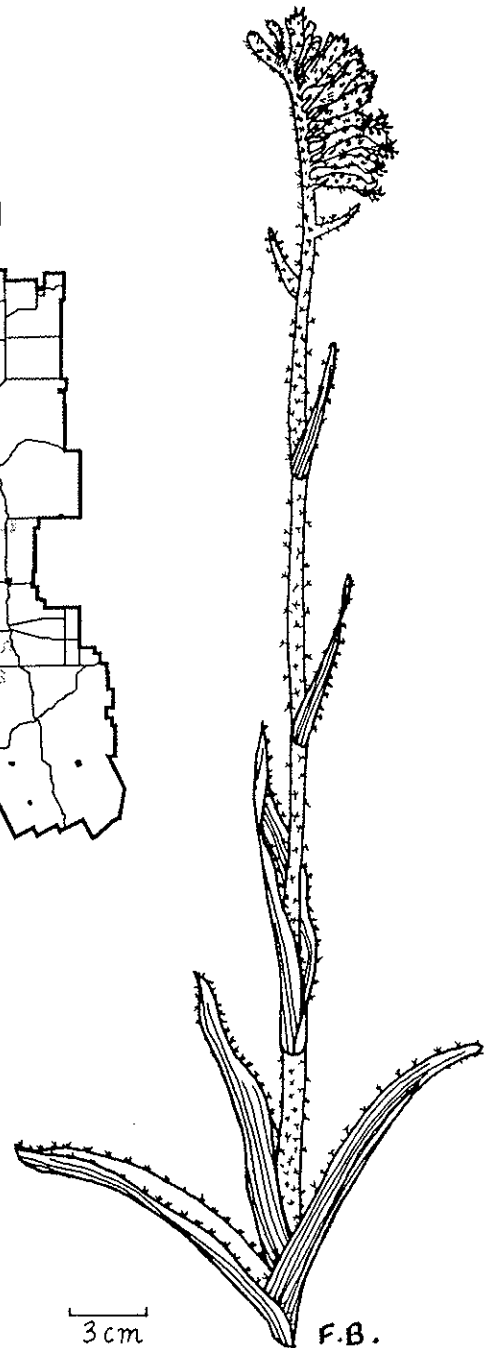
- Further survey is required, particularly to survey fully population 4.

References

Hopper (1987, 1993).



Locality Map



This species was described by Endlicher in 1846. Collections were made last century without details of locality by Drummond and Preiss but Oldfield recorded "Murchison River" as the locality for his collections of this species.

*Arnocrinum drummondii* is a perennial herb with a short rhizome covered by dense woolly hairs. The leaves are linear, arising in a tuft from the root, dying down each year. The leaf blade is 16-70 mm long with a few hairs. The inflorescence stems have few branches and are 25-54 cm tall, with tufts of hair at each branch or scale.

The inflorescence is a compressed spike, with brown, papery, sparsely hairy inflorescence bracts. The flowers are sessile with the blue perianth segments joined at base to form a tube 6 mm long and with six equal spreading lobes 7-8 mm long. They are twisted after flowering. There are six stamens and the ovary is superior.

Differs from *A. gracillimum*, which occurs in the Eneabba area, in its simple inflorescence stems, without numerous short sterile branchlets, and from *A. preissii*, in the brown, papery, sparsely hairy inflorescence bracts, whereas those of *A. preissii* are green-brown, hard and densely hairy.

**Flowering Period:** September-January in the north of the range, December in the Moora District and March in the York area.

#### Distribution and Habitat in the Moora District

Within the Moora District, *A. drummondii* has been collected from two localities 15 km apart, most recently in 1962. Habitat details for these collections indicate only that the species occurs in sand heath. More recent collections have been made within the Geraldton District from Kalbarri, Cooloomia and west of Mullewa, extending the geographic range of the species to ca. 400 km. It occurs in white or yellow sand in sandheath at Gunyidi and on dune or plateau tops or on sandplain in the Geraldton District. It was recorded in association with *Banksia sceptrum* and *Gyrostemon ramulosus* in a post fire thicket.

There is also one record from east of York, ca. 200 km SE of the populations in the Moora District.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* Gunyidi	-	-	19.12.1962	-	-
2.* Watheroo	-	-	1901	-	-

#### Response to Disturbance

Recorded from post-fire thicket at the most northerly record.

#### Susceptibility to *Phytophthora* Dieback

Unknown

#### Management Requirements

- Ensure that dieback hygiene procedures are carried out at all populations.

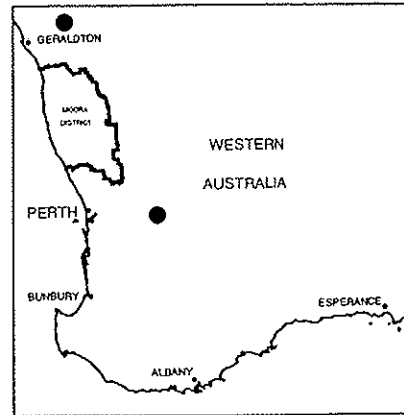
**Research Requirements**

- Further survey is required.

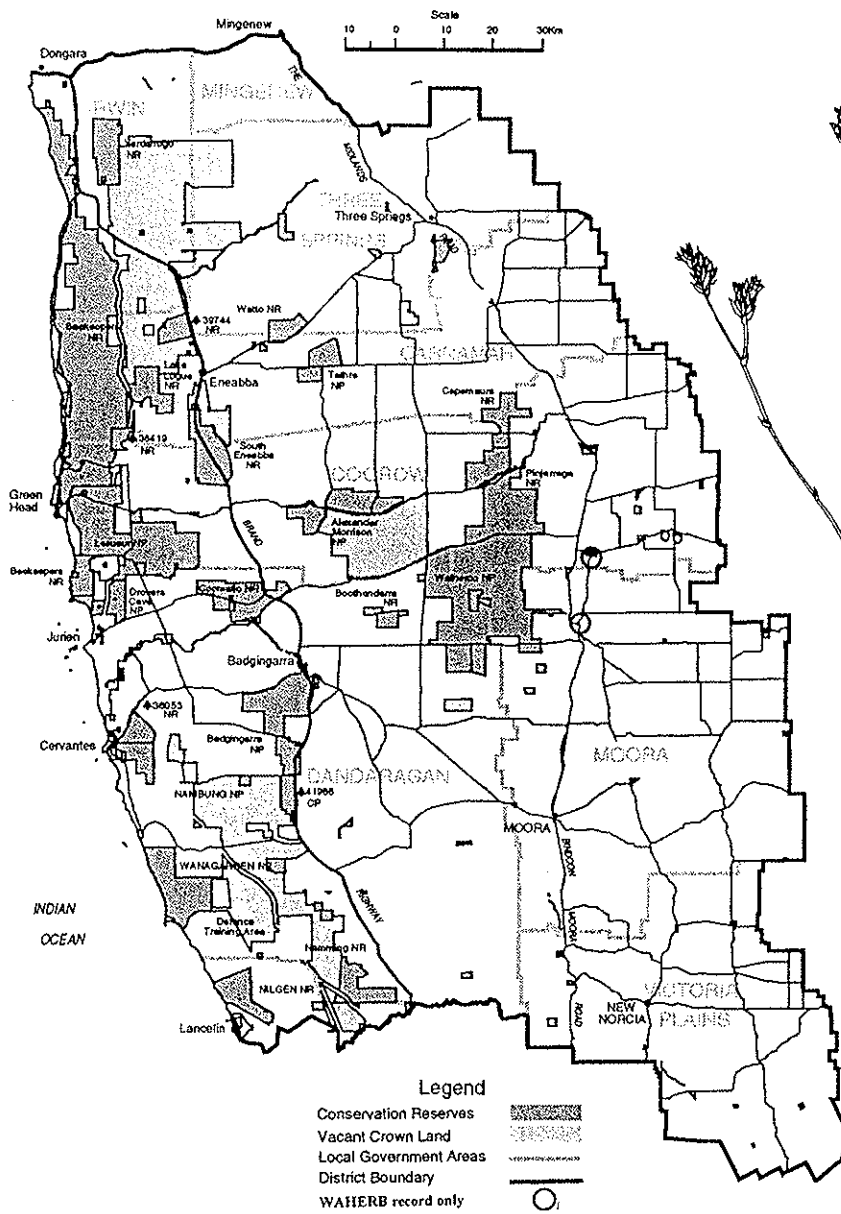
**References**

Bentham (1878), Keighery (1987), Lehmann (1846).

● *Arnocrinum drummondii*



Locality Map



*Astroloma* sp. Eneabba (N.Marchant s.n.)

## EPACRIDACEAE

An undescribed species allied to *Astroloma serratifolium* and first collected in 1965 from north of Badgingarra.

This taxon is an erect to spreading shrub to 1 m high and to 1.5 m wide with ovate pungent leaves and pale to dark pink flowers. The flower stalks in this species are generally longer than those of *A. serratifolium* which has very short pedicels covered with overlapping bracts. *A.* sp. Eneabba has flower stalks up to 4 mm long with bracts at the base but few on the stalk. The fruits are globular, green to red in colour and with striations.

**Flowering Period:** October-November, January, March-April

**Distribution and Habitat in the Moora District**

Occurs in the Moora District from east of Jurien to Arrowsmith and east to Three Springs. It has also been recorded in the past to north-east of Dongara and near Mingenew in the Geraldton District. The known geographic range is 80 km but may extend to 130 km.

Grows in lateritic gravel over sand or brown loam, brown-yellow clay, or white, yellow or grey sandy clay in open low wandoo woodland over scrub and low heath. Associated species include *Allocasuarina*, *Acacia*, *Gastrolobium* and *Dryandra* species.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
2.* E of Eneabba	Ca	-	21.4.1978	-	-
4.* E of Mt Peron	D	National Park	25.7.1980	-	-
5.* SE of Three Springs	-	-	7.9.1983	-	-
6. E of Eneabba	Ca	MRWA Road Verge	6.8.1992	2	Partly disturbed
7. E of Greenhead	Co	MRWA Road Verge	18.11.1992	30+	Undisturbed
8. E of Jurien	D	Education Reserve, MRWA Road Verge	15.8.1991	2	Undisturbed
9. N of Mt Lesueur	D	National Park	6.10.1991	5+	Disturbed
10. N of Eneabba	I	?VCL, MRWA Road Verge	30.4.1992	20+	Undisturbed
11. SW of Three Springs	TS	MRWA Road Verge	9.11.1991	3	Undisturbed
12. SSW of Eneabba	Co	Shire Road Verge	18.11.1992	5+	Good
13. E of Eneabba	Ca	MRWA Road Verge	19.8.1993	1+	Undisturbed
14. E of Jurien	D	?MRWA Road Verge	14.8.1991	10+	Partly disturbed
15. E of Greenhead	Co	MRWA Road Verge	5.1991	3	Undisturbed
16. SW of Three Springs	TS	MRWA Road Verge, Private	10.7.1991	10	-
17. SW of Mt Lesueur	D	Private	8.3.1991	2	Undisturbed
18.* N of Badgingarra	D	-	2.12.1965	-	-
19. Mt Benia	D	Reserve	2.5.1991	Occasional- WH	-
20. E of Greenhead	Co	Shire Road Verge	1.5.1991	Occasional- WH	-
21. Strawberry	I	Rail Reserve	5.8.1994	5+	Undisturbed
22. W of Mingenew	M	MRWA Road Verge	5.8.1994	1+	Narrow road verge, weeds

**Response to Disturbance**

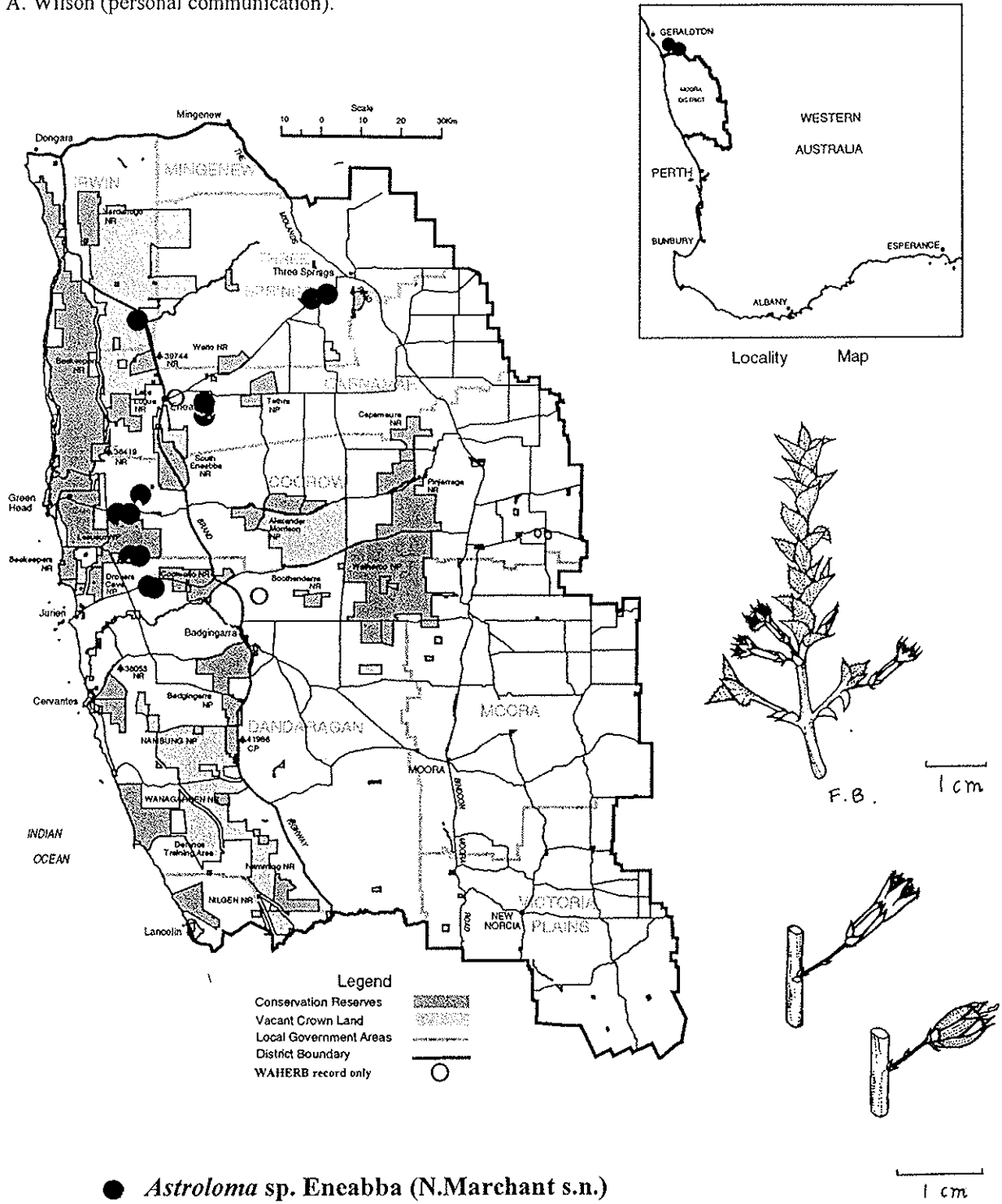
Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**References**

A. Wilson (personal communication).



● *Astroloma sp. Eneabba* (N. Marchant s.n.)

## *Boronia ericifolia* Benth.

RUTACEAE

This species was first collected by James Drummond in 1843. Its specific name refers to the genus *Erica*, the heaths, referring to its heath-like appearance.

*Boronia ericifolia* is an upright shrub to 1 m tall with stellate hairy branches and the leaves in threes. Each leaf is narrow, ca. 7 mm long with the margins curled under. The flowers have very short stalks and are situated at the bases of the leaves. The four petals are ca. 5 mm long, white or pale yellow in colour. The stamens are orange in colour and each anther has a short, white appendage.

**Flowering Period:** April, June-October

### **Distribution and Habitat in the Moora District**

*B. ericifolia* is known in the Moora District from two collections made from west of Moora but its main area of distribution is in the Wongan Hills, 80 km to the south-east in the Merredin District.

This species is recorded growing in yellow sand in the Moora District and in the Wongan Hills as growing in tall shrubland or thickets and sometimes under eucalypts, on slopes or low lying areas, on laterite or in yellow loam, sandy loam, or brown, gravelly clayey sand over laterite.

### **Conservation Status**

Current: Priority 2

### **Populations Known in the Moora District**

---

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* W of Moora	-	-	6.9.1966	-	-

---

### **Response to Disturbance**

Unknown

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

Unknown

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at population.

### **Research Requirements**

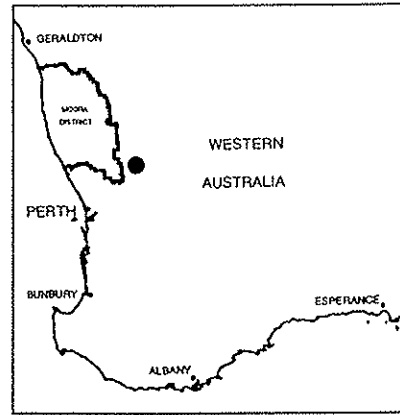
- Further survey is required.

### **References**

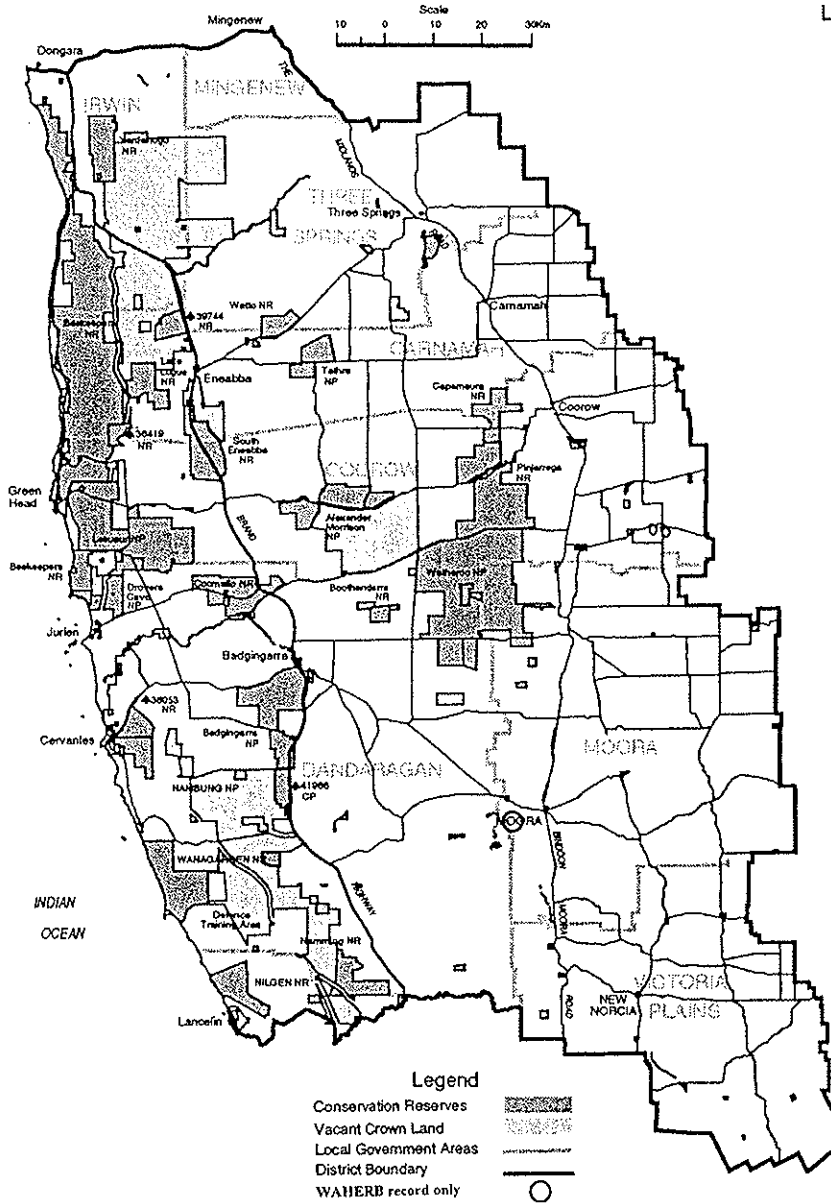
Bentham (1863), Elliot and Jones (1982), P.G. Wilson (unpublished data).



● *Boronia ericifolia*



Locality Map



F.B.



This species is known only from the Type collection which was made by Diels in 1901 from the Watheroo area.

It is an annual plant with rosetted basal leaves, up to 6 cm long, widening towards the tip to ca. 5 mm wide. The flowering stems are scarcely longer than the basal leaves and have similar but smaller leaves alternately or oppositely spaced on them. The flowers grow singly in the axils of these leaves and each has five narrow petals, ca. 8 mm long, rosy red in colour, with a white base. There are 6-8 stamens. The fruit is a four-valved capsule, ca. 2 mm long.

The only known specimen of this species has only one flower and the taxonomic status is uncertain until further work has been completed. It was stated in 1985 that it is almost certainly synonymous with another common species (J. Briggs, personal communication) but no further information is yet available.

**Flowering Period:** Late July

#### **Distribution and Habitat in the Moora District**

The type collection was made from Watheroo, in winter-wet areas, growing among short grasses in clay.

#### **Conservation Status**

Current: Priority 2

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.*Melbourne, Watheroo	-	-	30.7.1901	-	-

#### **Response to Disturbance**

Unknown

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

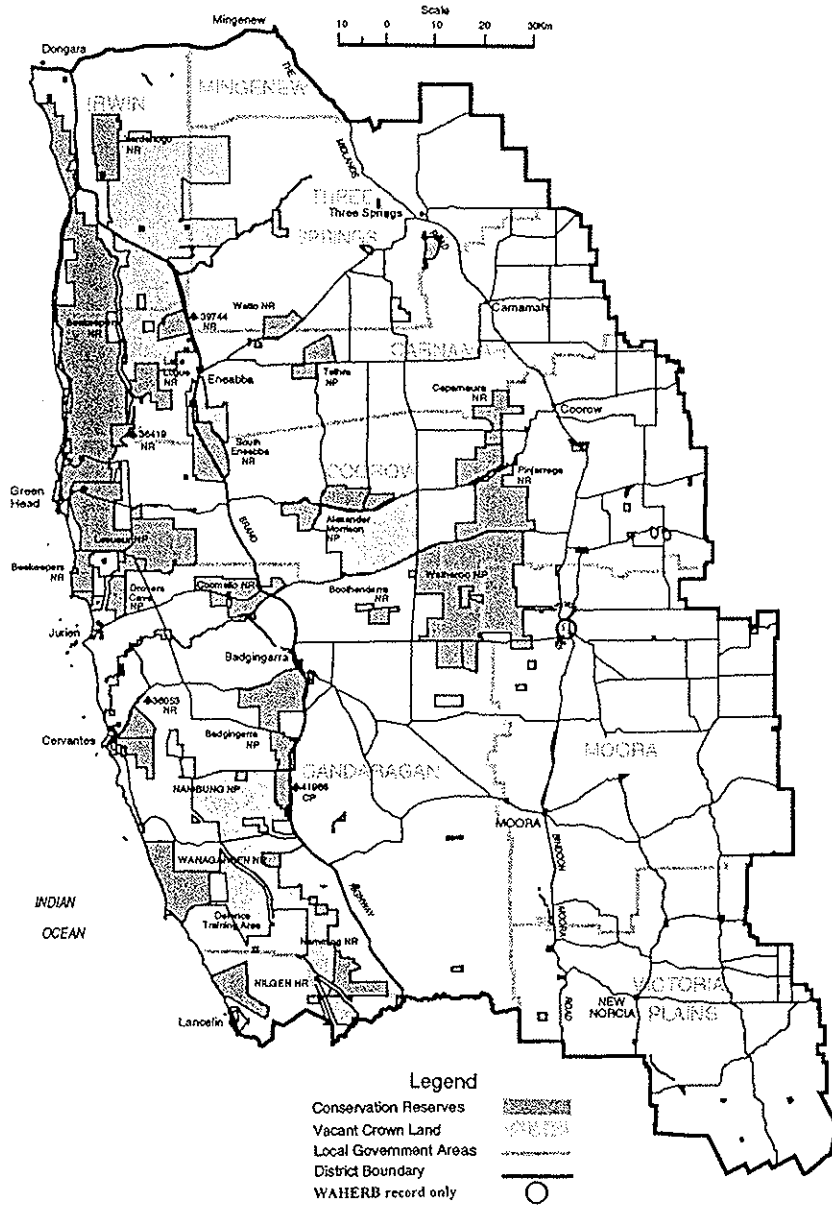
Unknown

#### **Research Requirements**

- Confirm the taxonomic status of the species.
- Conduct further survey in the Watheroo area if the taxonomic status is retained.

#### **References**

Poellnitz (1934).



*Calandrinia dielsii*

This species was first collected in 1968 but was not recognised as a distinct species until 1987. It was identified until then as either *Calytrix flavescens*, *C. asperula* or *C. aurea*.

*C. chrysantha* is an erect hairless shrub to 1.3 m tall. Stipules are present and are about 0.25 mm long. The leaves are appressed to the stem, closely spaced, oblong to linear in shape, 1.25-4 mm long and keeled. The flowers may be clustered. The bracteoles are 4-6 mm long, free, deciduous and turgid towards the apex. The hypanthium is trigonous, 10-12 ribbed, 7.5-10 mm long and adnate to the style. The calyx segments are joined at the base, the blade obovate, to 1.75 mm long, the awn 10 mm long. The five petals are yellow, ovate to lanceolate, up to 7 mm long. There are 45-55 stamens, with yellow filaments and a prominent globular connective on each anther.

This species is closely related to *C. flavescens* from which it differs in the distinctive form of the anther connective and the turgid bracteoles. *C. asperula* is also a close relative but *C. chrysantha* differs in the 10-12 ribbed hypanthium and the anther connective. The anther connective is similar in *C. aurea*, but this species has long acuminate bracteoles and larger leaves.

**Flowering Period:** December-February

#### Distribution and Habitat in the Moora District

Known from four populations north and west of Eneabba over a range of ca. 40 km, but herbarium records indicate a larger range of ca. 70 km also to the south and east of Eneabba.

Grows in high open shrubland or open low woodland over heath, on coarse brown sand, white to yellow clayey sand, white sand over gravel, and on grey or yellow sand, sometimes in seasonal swamps. Associated species include *Eucalyptus todtiana* and *Banksia attenuata*.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Eneabba	I	VCL	25.11.1993	1000+	Healthy
2. NE of Eneabba	TS	Shire Road Verge, Private	25.11.1993	200+	Healthy
3. E of Lake Indoon	Ca	Shire Road Verge	9.12.1992	20 est.	Recently burnt and partly disturbed
4. NW of Eneabba	Ca	VCL	8.1.1992	5+	Undisturbed
5.* E of Jurien	-	-	12.1978	-	-
6.* 8 km S of Eneabba	-	-	5.2.1977	-	-
7.* E of Eneabba	-	-	1.1968	-	-
8.* 14 km S of Eneabba	-	-	16.12.1976	-	-
9. 25 km S of Eneabba	-	-	Undated	-	-

#### Response to Disturbance

At one population the plants were growing well on the disturbed soil of a firebreak.

#### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

### Management Requirements

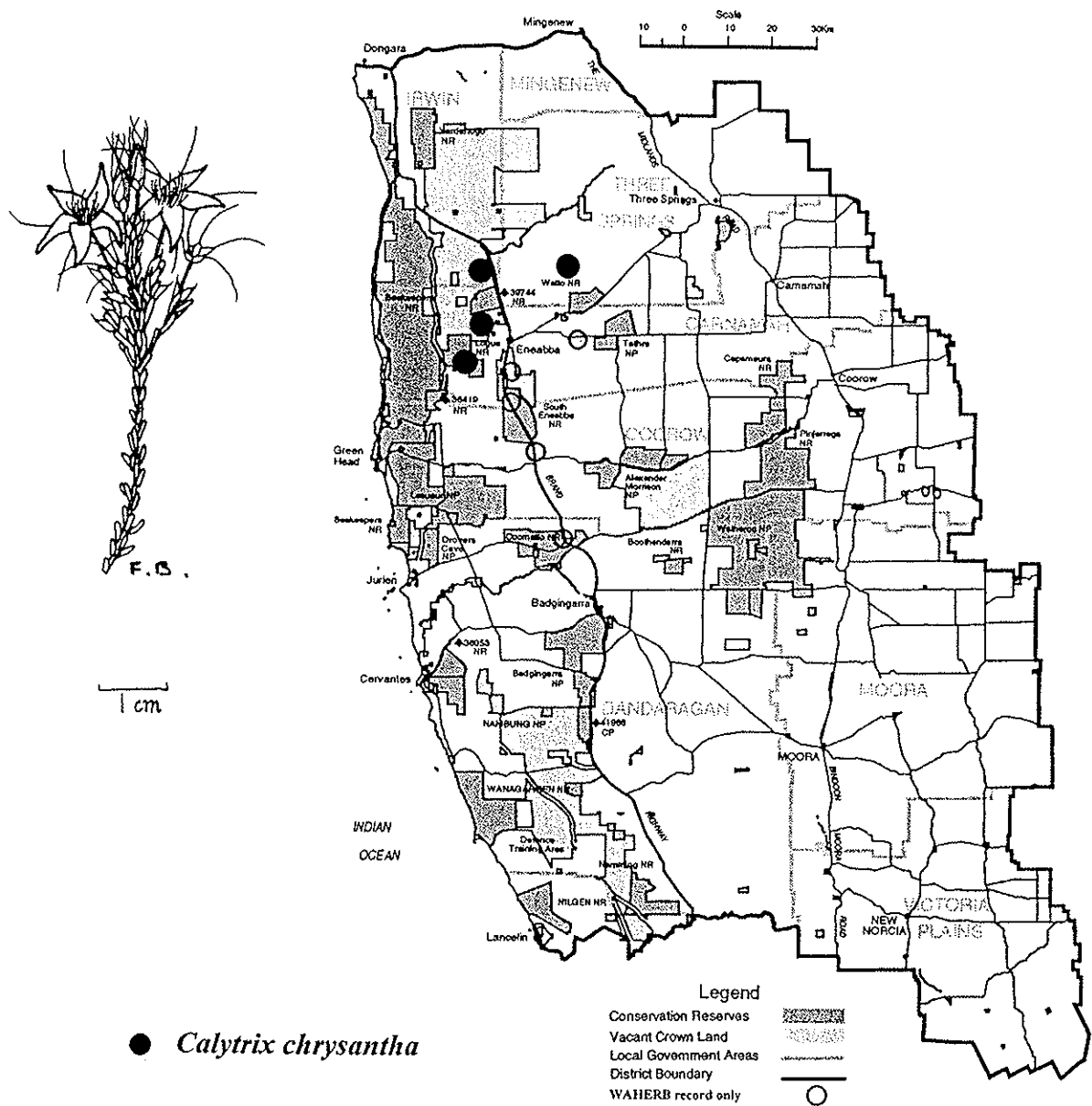
- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that road verge populations have markers.
- Liaise with Shire and landowner.

### Research Requirements

- Further survey is required to determine the present geographic range and conservation status of this species.

### References

Craven (1987b).



This species was first collected by James Drummond from an area in the north of the Moora District between the Irwin and Arrowsmith Rivers.

*Calytrix drummondii* is a shrub to 1 m tall with closely spaced leaves, which are linear, 4-20 mm long, to 1 mm wide. There are no stipules. The flower heads are scattered, with bracteoles joined to form the narrowly funnel-shaped cheiridium, which is 6-8 mm long, with a long spreading apex. The hypanthium is 8-13 mm long, with 8 to 10 ribs, hairless and unequally triangular in cross-section, completely joined to the style. The calyx segments are joined at the base, produced into an awn to 15 mm long. The petals are yellow, 6-8 mm long. There are 55-85 stamens, the filaments yellow, and the anther connective prominent, often produced into a blunt horn.

**Flowering Period:** November-January

#### Distribution and Habitat in the Moora District

Known from five populations in the Moora District over a range of 40 km but occurs north from the District to the Kalbarri area with a total geographic range of over 300 km.

Recorded as growing on sand over gravel and white, yellow or grey sand, in low heath. Associated with species of *Jacksonia*, *Melaleuca*, *Banksia* and *Hibbertia* species.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Badgingarra	D	MRWA & Shire Road Verges	8.1.1992	3	Undisturbed
2. Brand Highway, N of Tootbardie Road	Co	MRWA Road Verge	8.1.1992	6+	Undisturbed
3. E of Warradarge Hill	Co	Shire Road Verge	8.1.1992	2	Undisturbed
4. Marchagee Track	Co	-	5.12.1992	-	-
5. Tathra	Ca	National Park	3.12.1992	-	-
6.* W of Winchester	Ca	-	6.12.1978	-	-
7.* Greenhead Road	Co	-	14.1.1979	-	-

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

#### Management Requirements

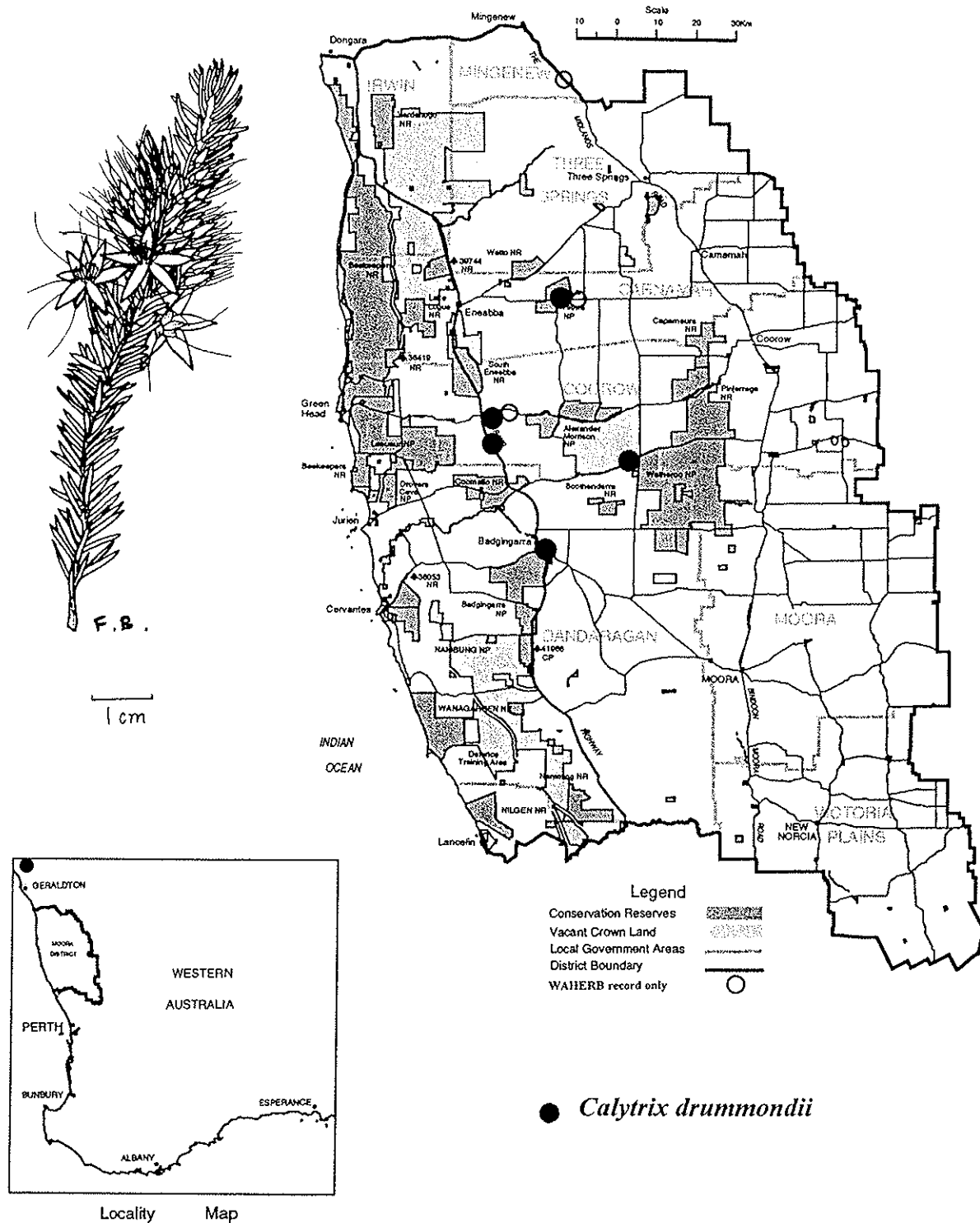
- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that markers are in place at road verge populations.

## Research Requirements

- Further survey work is required for this species, particularly northwards from the Badgingarra area in the Moora District towards Mingenev, where earlier collections have been made, and in the Kalbarri to Northampton area of the Geraldton District.

## References

Craven (1987b).



This species was described in 1987 and was first collected in 1966.

*Calytrix eneabensis* is a shrub growing to 1 m or more in height, with alternate leaves which are overlapping to widely spaced, the stipules absent. The leaf blade is lanceolate, 3.5-10.5 mm long, shallowly lunate to lunate in cross-section. The cheiridium is funnel-shaped, 8-9 mm long, with a lateral, scabrid keel.

The hypanthium is 10-13 mm long, 10-ribbed, hairless and partly free from style. The free region tightly surrounds the style. The calyx segments are joined at the base and each has a scabrid awn to 10 mm long. The petals are purple and yellowish-white at the base and there are 40-60 stamens in three or four rows.

This species is closely related to *C. depressa*, which has narrower leaves which are triangular in cross-section and in which the hypanthium is free, not fused to the style.

**Flowering Period:** August-October

#### Distribution and Habitat in the Moora District

This species has been recorded in the past over a range of ca. 36 km from the Eneabba area. However, known populations recently inspected are located to the north of Eneabba over a range of ca. 11 km.

*C. eneabensis* is recorded growing in heath on sand, high shrubland on grey sand over laterite, and in open low woodland on yellow sand. Associated species include *Eucalyptus tottiana*, *Nuytsia floribunda*, *Banksia attenuata*, *B. menziesii*, *B. hookeriana*, *Adenanthos cygnorum*, *Xylomelum angustifolium* and *Hakea obliqua*.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. NW of Eneabba	Ca	Nature Reserve, VCL & Shire Road Verge	24.9.1992	1000+	Undisturbed
2. NW of Eneabba	Ca	VCL	19.8.1993	100+	Undisturbed
3. N of Eneabba	I	VCL	25.11.1993	500+	Healthy
4.* SW of Eneabba	Ca	-	1.10.1981	-	-
5.* SE of Eneabba	Co	Nature Reserve	27.9.1979	-	-
6. NW of Eneabba	Ca	Nature Reserve	20.11.1992	-	-
7. Eneabba	Ca	Townsite Reserve	12.9.1990	Common-WH	-

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

#### Management Requirements

- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that road verge populations are marked.

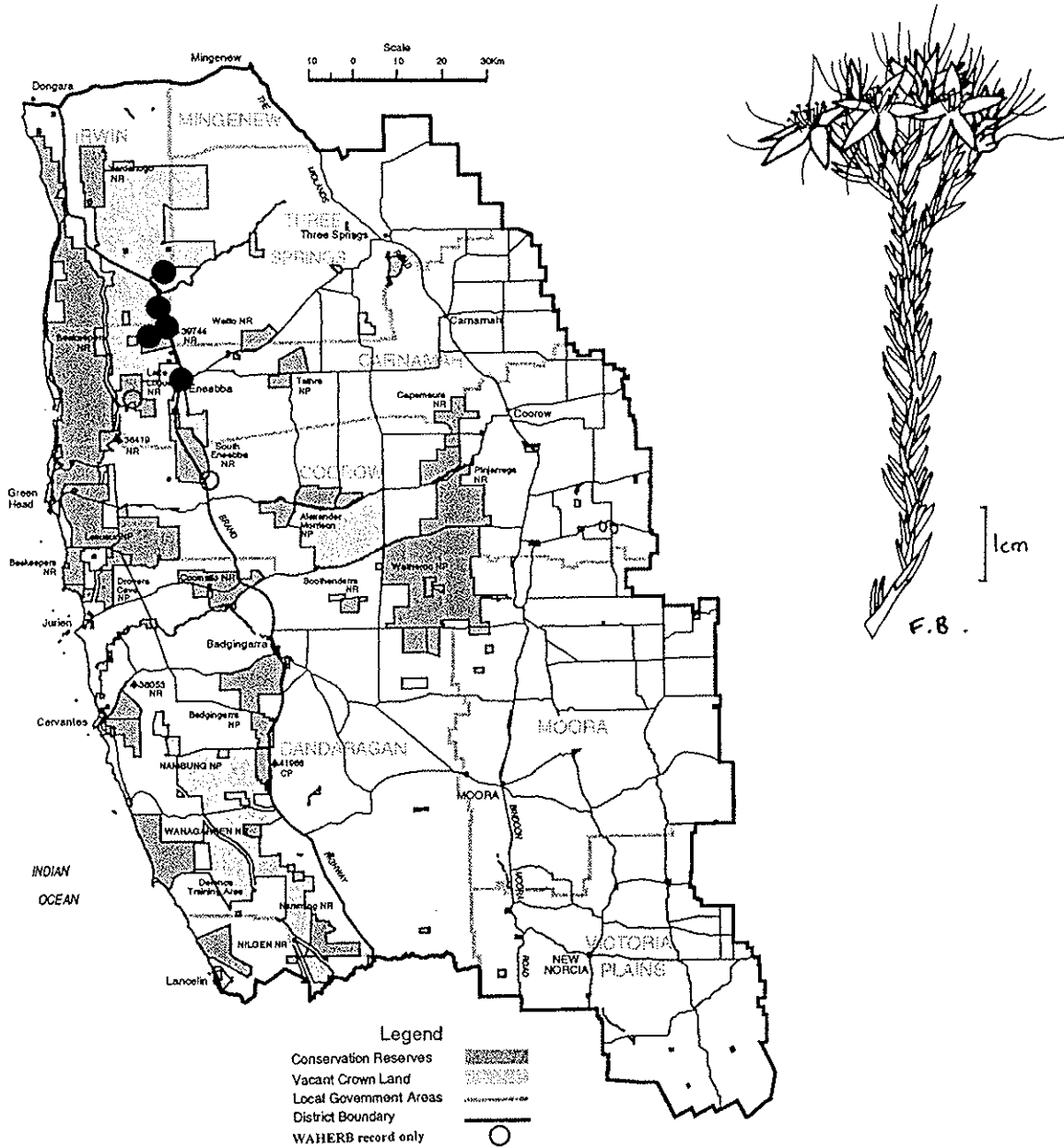


## Research Requirements

- Further survey is required, particularly to refind and fully survey populations 4-7.

## References

Craven (1987b), Elliot and Jones (1990).



● *Calytrix eneabbensis*

This species was described in 1987 and was first collected in 1971.

*Calytrix platycheiridia* is a glabrous shrub to 0.5 m tall. The apices of the flowering stems continue the growth, with the leaves overlapping or closely spaced. They are hairless, with an ovate blade to 4.5 mm long and to 2.5 mm wide. There are no stipules. The cheiridium is nearly flat, to 5 mm long. The hypanthium is up to 4 mm long, glabrous and 8-10 ribbed. There are five calyx segments which are short, to 0.5 mm long, ending in short projections. The petals are cream in colour and yellow in the basal half. The flowers are 1 cm in diameter. The stamens are yellow, 35-50 in number.

This species is superficially similar to *Calytrix ecalycata* (formerly *Calythropsis aurea*) which has four petals rather than five.

**Flowering Period:** October

#### Distribution and Habitat in the Moora District

This species is known from four populations over a range of 12 km to the north-west of Watheroo.

It has been recorded growing in open low vegetation on pale yellowish-brown sand of a low sand ridge, and on a flat site in tall open scrub and open *Banksia attenuata* woodland on white sand, and also in a slight depression on pale yellow sand. It also occurs in tall shrubland with *Actinostrobilus* sp. and species of *Baeckea*, *Eremaea*, *Leptospermum* and *Verticordia* on pale yellow-brown sand.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Pinjarrega	Co	Nature Reserve	9.10.1991	30+	Undisturbed
2. Pinjarrega	Co	Nature Reserve	23.10.1992	100+	Undisturbed
3. E of Lake Eganu	Co	Nature Reserve	23.10.1992	5+	Undisturbed
4. Marchagee Track	Co	Nature Reserve, Shire Road Verge & National Park	23.10.1992	200+	Good, but firebreak running through population
5.* Marchagee Track	Co	-	29.10.1981	-	-
6.* NW of Watheroo	-	National Park	7.10.1971	-	-

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

#### Management Requirements

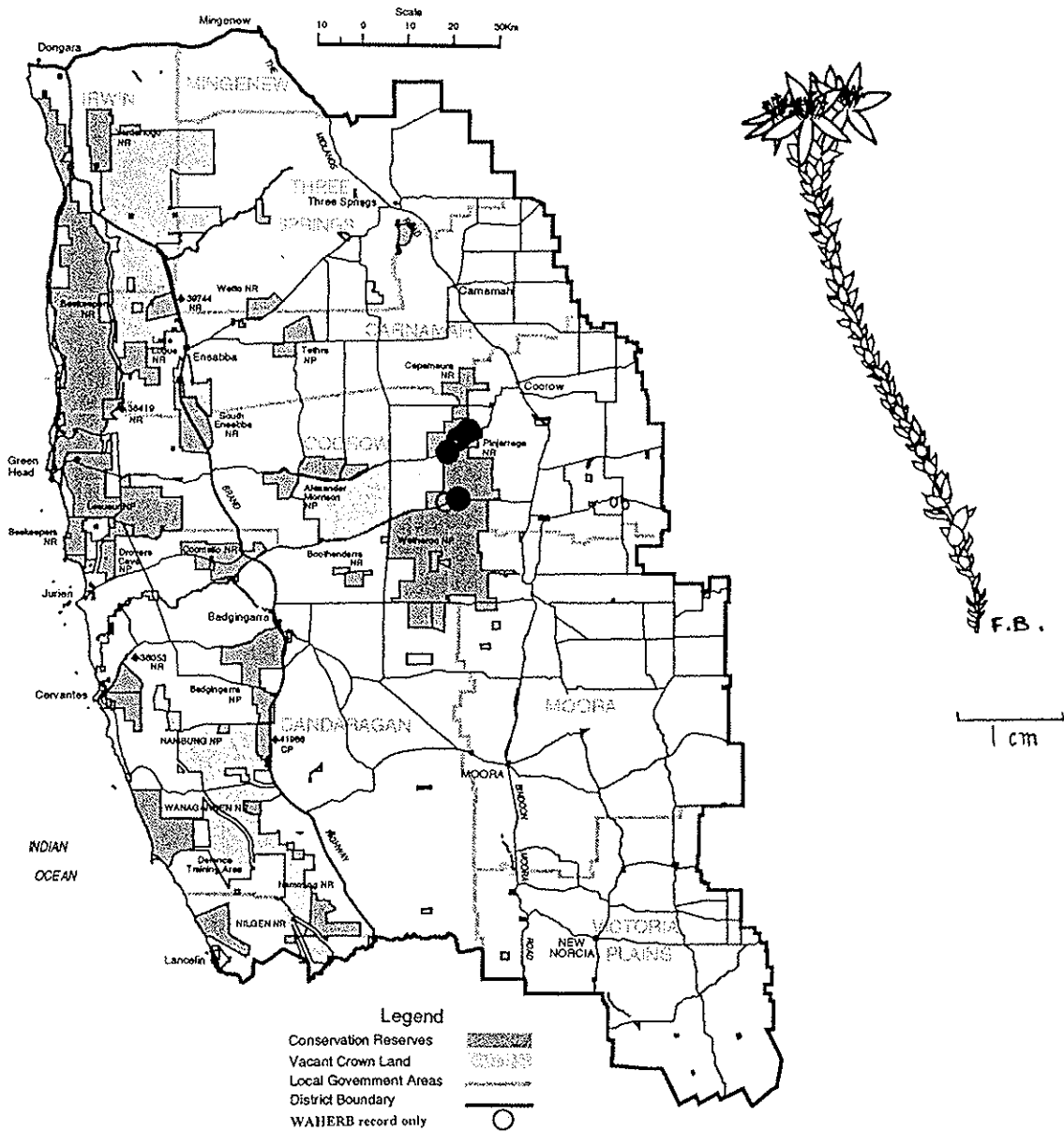
– Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- The species may well be more common in the area where the known populations occur, which has a series of large conservation reserves. Further survey on foot is required north and south along the drainage lines on which this species occurs as there are few tracks and more populations may exist within the national park between the northern and southern known populations and also further south (population 6).

**References**

Craven (1987b), Elliot and Jones (1990).



● *Calytrix platycheiridia*

*Calytrix superba* C.A.Gardner & A.S.George

MYRTACEAE

Superb Starflower

This species was described in 1963 from specimens collected by Charles Chapman in 1961.

*Calytrix superba* is a hairless shrub sometimes growing to 1 m tall, but is usually shorter, 0.3-0.6 m in height. The leaves are scattered or overlapping, oblong-linear, 4-8 mm long with short stalks. There are small stipules present, to 0.3 mm long.

The flowers are in terminal clusters, with longer leaves below the clusters, to 11 mm long with white membranous margins. The bracteoles are 10-12 mm long, free almost to the base, with sharp recurved apices. The hypanthium is 10-15 mm long, hairless, 10-ribbed, completely joined to the style. The rounded calyx lobes are joined at the base and are produced into awns at the tip, which are 13 mm long. The petals are large, bright pink in colour and yellow at the base. The flowers are up to 3.5 cm in diameter. There are about 25 stamens with pink filaments swollen at the middle.

The flowers of *C. superba* are much larger than those of any other species of *Calytrix*. The swollen anther filaments are also unique to this species.

**Flowering Period:** November-February

**Distribution and Habitat in the Moora District**

The species is at present known from populations over a range of 6 km to the north-west of Eneabba. Herbarium records indicate that the range has extended in the past over 30 km to the north and south of Eneabba.

*C. superba* has been recorded as occurring in low heath, on grey sand over clay, on lateritic sand and on white sand, and in high shrubland with open shrub understorey on brown sand and lateritic gravel at the top of a rise. It has also been recorded in low heath with open low woodland of *Eucalyptus tottiana* on white sand. Species of *Conospermum*, *Melaleuca*, *Calothamnus* and *Allocasuarina* have been recorded as growing in association with it.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
2. S of Beekeepers Road	Ca	Nature Reserve	30.4.1992	20+	Undisturbed
3. NW of Eneabba	Ca	VCL ?now Nature Reserve	8.1.1992	1000+	Undisturbed
4.* S of Eneabba	Ca	Nature Reserve	5.2.1977	-	-
5.* N of Eneabba	-	-	6.12.1982	-	-
6.* Eneabba South Road	Co	-	24.1.1979	-	"common"
7.* S of Lake Indoon	-	-	16.12.1976	-	-
8.* Eneabba	Ca	-	10.2.1971	-	-

**Response to Disturbance**

Plants have been observed to be larger in open situations around a sand quarry than those in adjacent heath.

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

### Management Requirements

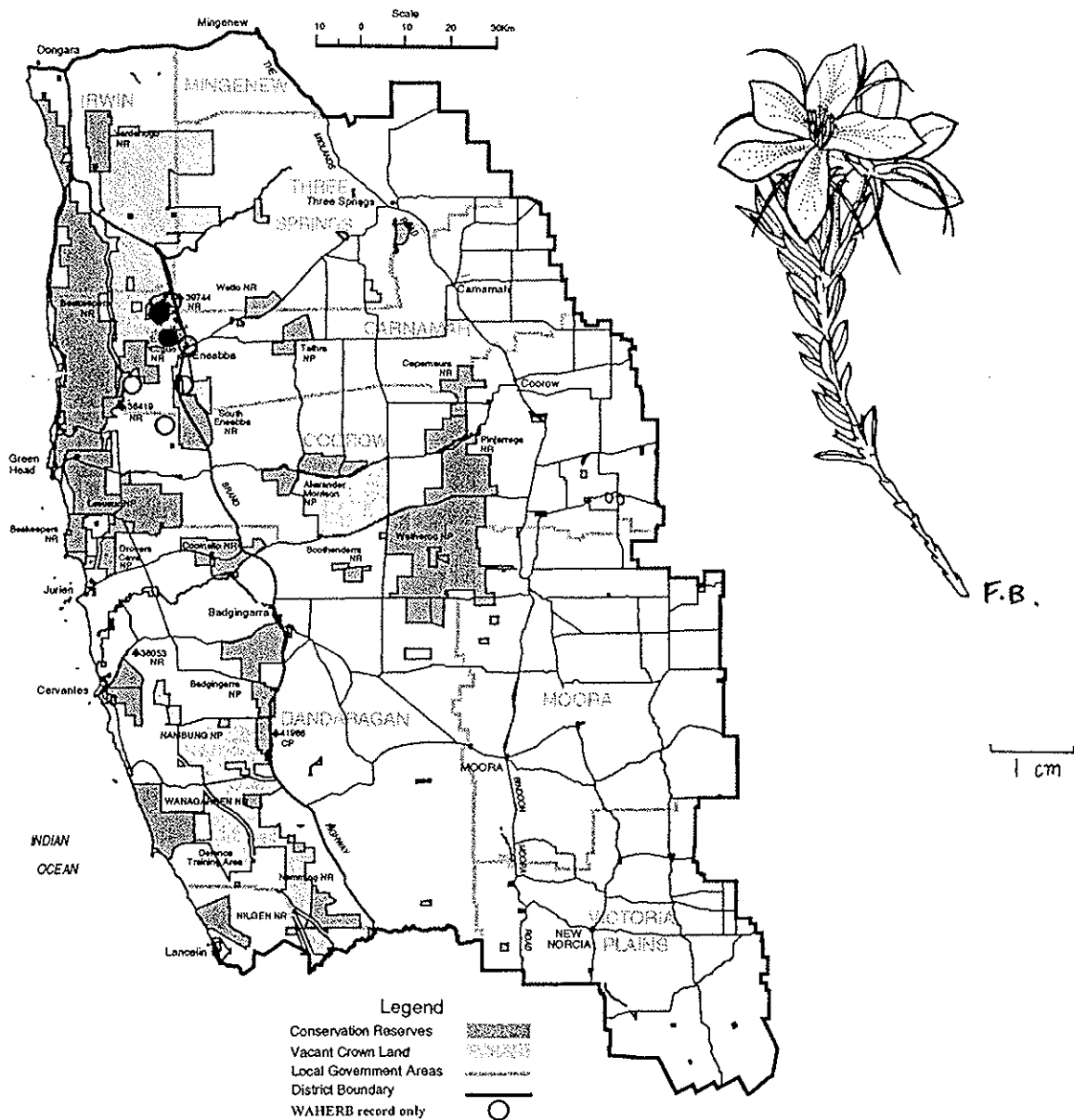
- Ensure that dieback hygiene procedures are carried out at all populations.

### Research Requirements

- Further survey is required throughout the range indicated by herbarium records to establish the present range and conservation status of the species. Full survey is required for population 1.

### References

Craven (1987b), Dixon (1990), Elliot and Jones (1990) Gardner and George (1963).



● *Calytrix superba*

*Caustis gigas* ms is an undescribed species first collected in 1969.

It is a robust perennial herb to 2 m, with thick fibrous roots and straight green stems, arising from a rhizome. The leaves are reduced to dark brown bracts up to 4.5 cm long, which sheath the stem and are produced into a pungent point on one side. There are several branchlets arising from the axil of each bract. The male and female spikelets are solitary and separate, 1 cm in length. The spikelets have at least one or more bisexual flowers with male flower below. The glumes are spirally arranged, brown in colour with pungent points. The lower sterile glumes are shorter than the floral glumes. There are no perianth segments. There are 3-6 stamens and three or more branches of the style. The fruit is a nut, with no more than one nut maturing in each spikelet.

**Flowering Period:** May

#### Distribution and Habitat in the Moora District

Occurs over a limited range of 12 km in an area to the south-west of Coorow.

It has been recorded growing in sand heath, in white or grey sand, in open low woodland of *Eucalyptus tottiana* over heath on pale brown sand on a flat low plain, and in open tree mallee over low scrub on white sand and laterite on slopes. Associated species include *Adenanthos cygnorum*, *Lambertia multiflora*, *Actinostrobilus acuminatus*, *Dryandra* and *Melaleuca* species.

*C. gigas* ms has been recorded several times from the national park which is its only known area of occurrence. However, there is an extensive area of uncleared vacant crown land to the south of this which has not been fully surveyed for this species.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Coorow	Co	National Park	14.8.1991	100+	Undisturbed
2. SW of Coorow	Co	National Park	1.5.1991	59 est.	Partly disturbed by firebreak
3. SW of Coorow	Co	National Park	1.5.1991	Approx. 50	Partly disturbed
4. SW of Coorow	Co	National Park	1.5.1991	Approx. 20	Partly disturbed
5. SW of Coorow	Co	MRWA Road Verge	1.5.1991	Approx. 20	Partly disturbed
6. SW of Coorow	Co	Shire Road Verge	1.5.1991	Approx. 10	Partly disturbed

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

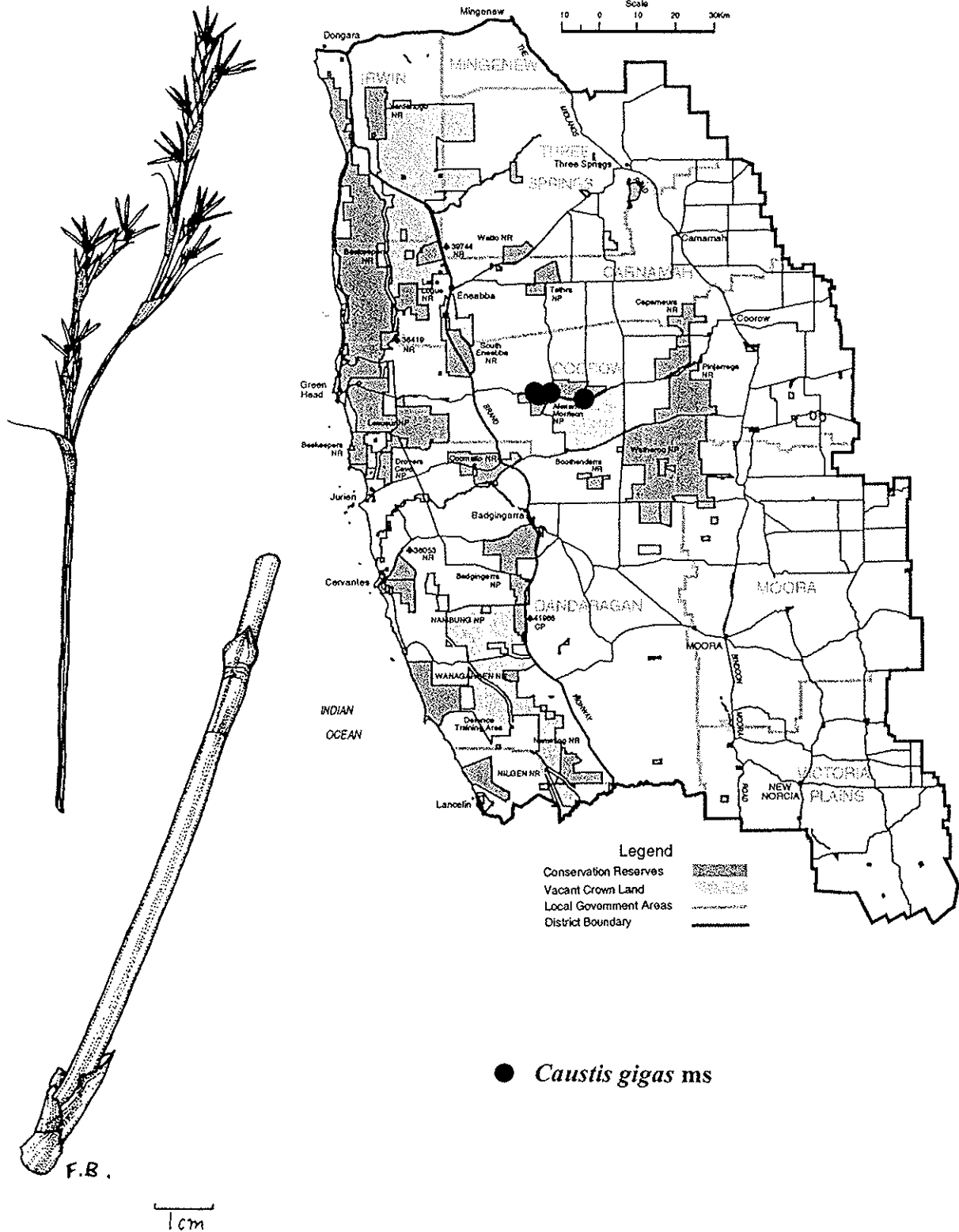
Unknown

#### Management Requirements

- Ensure that road verge populations are marked.
- Ensure that dieback hygiene procedures are carried out at all populations.

## Research Requirements

- Further survey needs to be undertaken, particularly in uncleared areas adjacent to the location of the known populations.
- Further taxonomic study is required.



● *Caustis gigas ms*

## *Comesperma rhadinocarpum* F.Muell.

POLYGALACEAE

Slender-fruited *Comesperma*

*Comesperma rhadinocarpum* was first collected in November 1877 by Mueller "in thickets near the Greenough, Arrowsmith and Irwin Rivers" and a description of the species was published in 1878. The species was presumed extinct until refound in 1977 south of Eneabba, although was not recognised until a further population was found in 1988.

This species is a low perennial herb to 45 cm in height. The leaves are linear lanceolate, 6-10 mm long, with slightly roughened margins. The pea-like flowers are blue and yellow, in long racemes at the end of the stems. The fruit capsules are long and narrow, to 9 mm long, 1.5 mm wide, containing brown seeds each with a tuft of long hairs at the tip. The specific name refers to these characteristic capsules, from the Greek, *rhadinos*, slender, and *karpos*, fruit.

**Flowering Period:** Late September-January

### **Distribution and Habitat in the Moora District**

The species has been recorded five times since Mueller's early collection. Its distribution ranges from southwest of Mullewa to the Perth Region, with two collections from the Moora District between Badgingarra and Eneabba.

Grows in yellow or grey sandy clay or sandy soils, in open low scrub. The species may be a disturbance opportunist, having been found twice in disturbed areas and once on a graded road verge.

### **Conservation Status**

Current: Priority 2

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Badgingarra	D	Shire Road Verge	6.1.1992	5	On graded road edge
2.* S of Eneabba	Ca	-	30.9.1977	-	-

### **Response to Disturbance**

Appears to be a disturbance opportunist.

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

Unknown

### **Management Requirements**

- Ensure that population 1 has markers in place on the correct road verge.
- Ensure that dieback hygiene procedures are carried out at all populations.

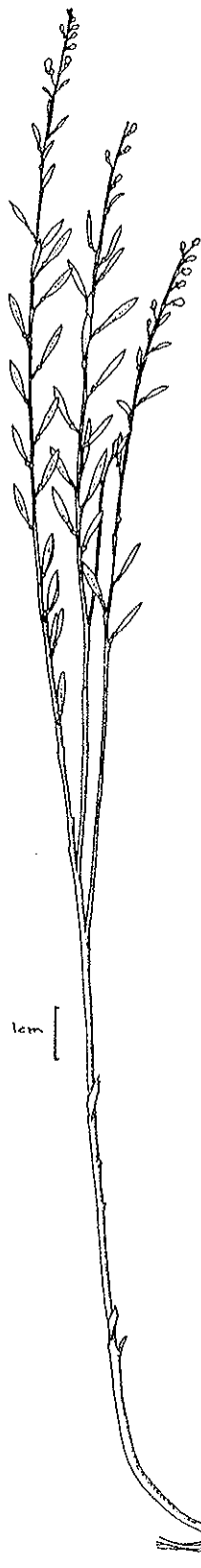
### **Research Requirements**

- Further survey is required.

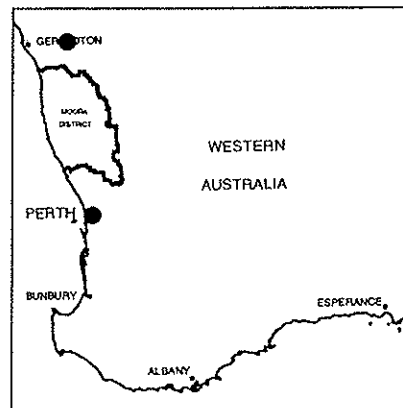
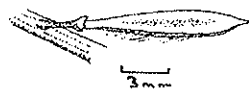
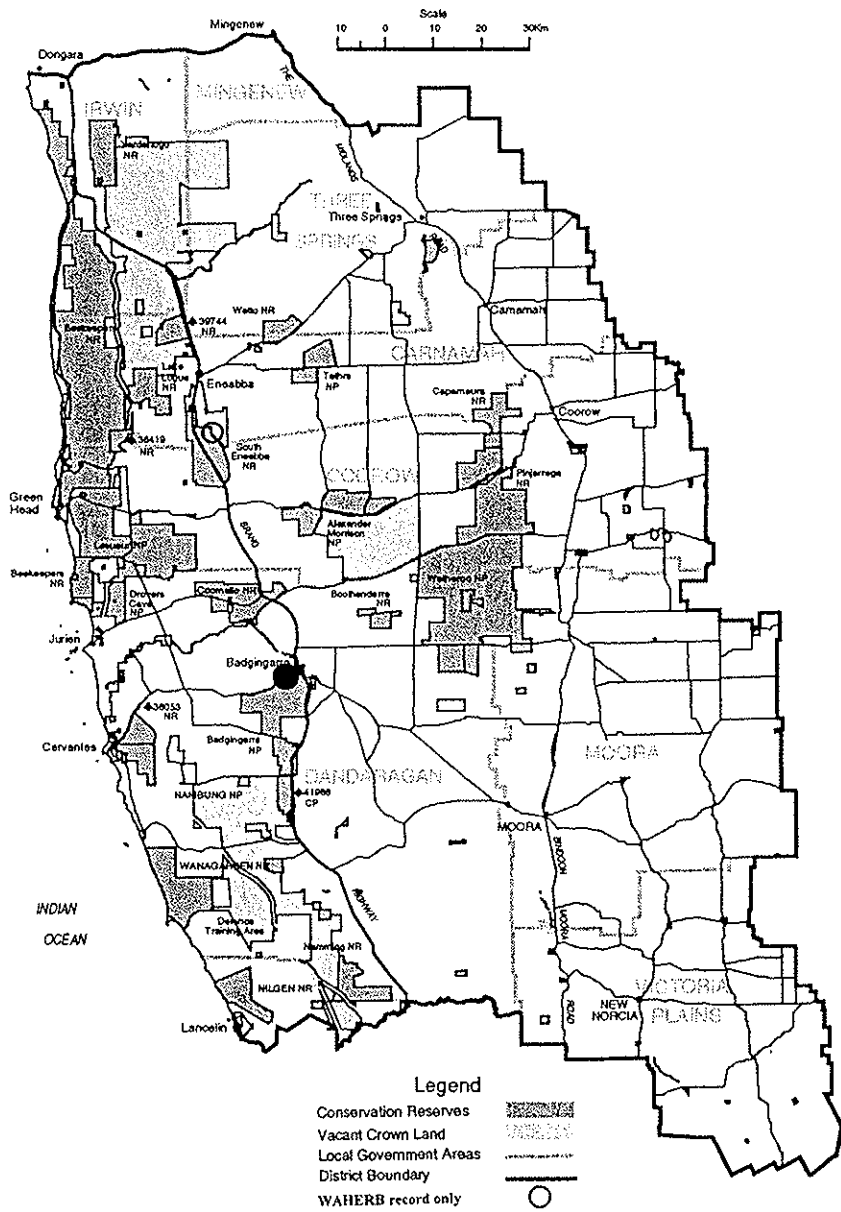
### **References**

Leigh *et al.* (1984), Mueller (1878).





● *Comesperma rhadinocarpum*



Locality Map

## *Crassula helmsii* (Kirk) Cockayne

CRASSULACEAE

Swamp Stonecrop, Swamp Crassula

*Crassula helmsii* is an annual plant with branches up to 12 cm long which spread along the ground. The leaves are lanceolate to oblong elliptic, 3-8 mm long and 1.5-2.5 mm broad. The flowers grow singly or up to three from the axil of one leaf per node and have the parts in fours. The calyx is shorter than the corolla, the four lobes are triangular, to 0.8 mm long. The corolla is cup-shaped, white in colour, with four spreading lobes to 2 mm long.

The style is about half as long as and tapering into the ovary, and the carpels each have 4-16 ovules.

**Flowering Period:** Unknown in Western Australia, November-April elsewhere.

### **Distribution and Habitat in the Moora District**

This species is distributed throughout eastern Australia mainly in the south-east. There are a few records from Western Australia, the first made by James Drummond in 1840 without locality information other than "Swan River". The species is saline tolerant and seems to grow readily from seed, so it is thought that it might have been transported around the coast from further east. A collection from near Lake King was found to have been made in Victoria. There is one collection from the Moora District from near Eneabba. There was one small plant present which was grown on before identification, with the possibility of contamination.

This species grows in or around standing freshwater, in water forming dense masses with intertwining stems and long branches floating on the surface, or forming dense mats several centimetres high on moist soils beside fresh water. The site at Eneabba was not typical for the habitat of the species.

It is possible that this species has always been rare in Western Australia and the disjunct distribution may represent repeated introductions which have not spread.

It has been concluded recently (F. Dawson, personal communication) that *C. helmsii* is probably not native to Western Australia.

### **Conservation Status**

Current: Priority 2

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* S of Eneabba	Ca	VCL (Mining Lease)	18.9.1977	-	-

### **Response to Disturbance**

Unknown

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

Unknown

### **Management Requirements**

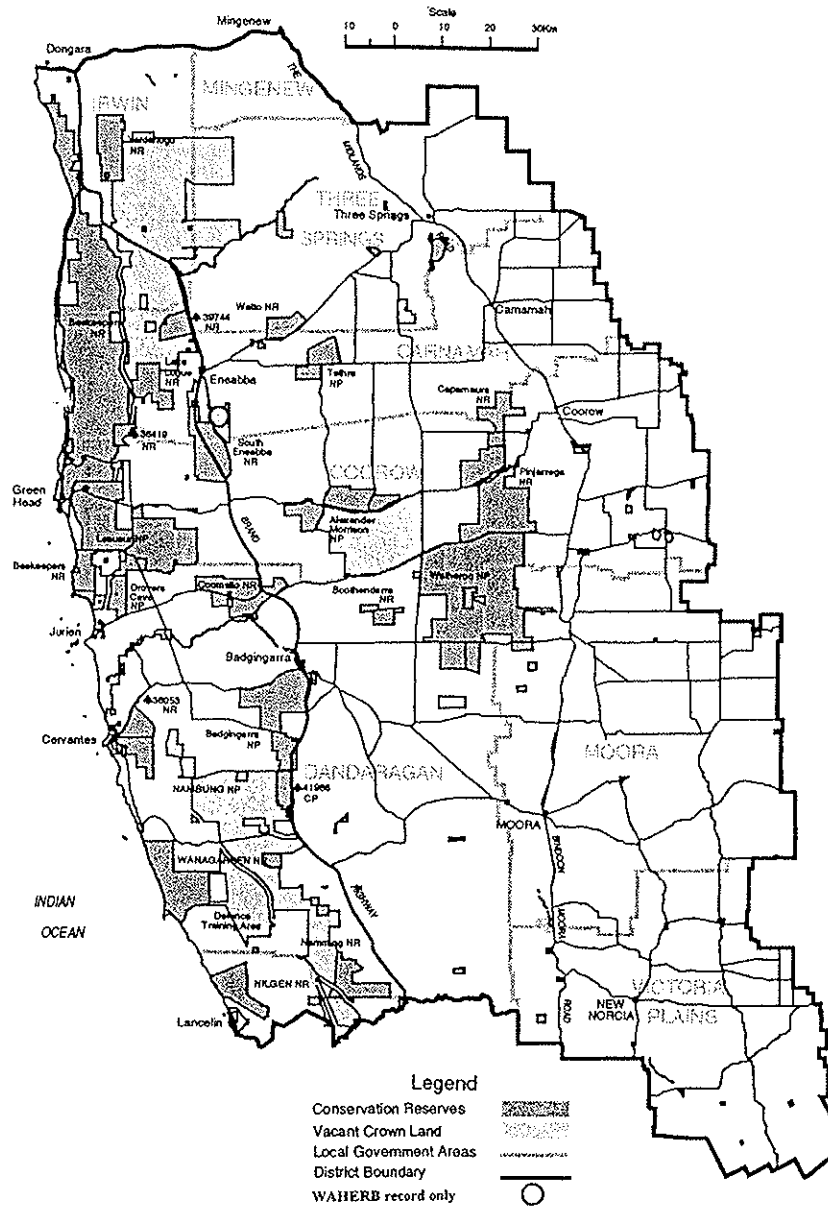
- Ensure that dieback hygiene procedures are carried out at population.

**Research Requirements**

- Further survey is required.
- Confirm natural status, or if not confirmed, delete from Priority List.

**References**

Aston (1973), F. Dawson (personal communication), Hooker (1840), Toelken (1981), H. Toelken (personal communication).



*Crassula helmsii*

## *Daviesia debilior* Crisp subsp. *debilior*

FABACEAE

*Daviesia debilior* is a straggling shrub to 0.6 m tall and 1.6 m broad with angular, ribbed branchlets and ascending phyllodes, which are decurrent, angular, ribbed and linear, to 120 mm long, and 2 mm wide. These are abruptly reduced to small scale leaves on the upper branches. The flowers are in short, cluster-like racemes with 2-4 flowers and partly enclosed at the base by overlapping, cupped bracts to 3 mm long, which conceal the stalk of the inflorescence. The standard petal is yellow with a dark red centre, to 5.5 x 6.5 mm, the wings and keel are dark red. The fruit is a compressed pod, to 17 mm x 10 mm.

*D. debilior* subsp. *debilior* differs from *D. debilior* subsp. *sinuans* in having phyllodes on the lower parts of the branches. In subsp. *sinuans* they are all reduced to scale leaves.

This species is related to *D. hakeoides* which has pungent phyllodes and beaked pods and the phyllodes are reduced gradually up the stems to scale leaves. It is also related to *D. juncea* which has larger flowers, a differently shaped calyx and terete, striate branchlets.

**Flowering Period:** May-July

### **Distribution and Habitat in the Moora District**

Has been recorded from Eneabba to the Lesueur area in the Moora District and from Wannamal and Darlington in the Swan Region.

Grows in shallow sand over lateritic gravel or clay amongst low open heath.

This taxon was not included in the Priority Flora List until late during this survey so was not searched for.

### **Conservation Status**

Current: Priority 2

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* NW of Mt Lesueur	D	?National Park	30.8.1979	-	-
2.* S of Eneabba	Ca	VCL (Mining Lease)	27.4.1978	-	-
3.* E of Eneabba	Ca	-	19.6.1977	-	-
4.* SW of Eneabba	Co	-	25.8.1977	-	-
5.* SW of Eneabba	Co	-	17.5.1979	-	-

### **Response to Disturbance**

Regrowth has been recorded from an intact root 10 cm below the old soil surface in an area of mining.

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

Presumed susceptible

### **Management Requirements**

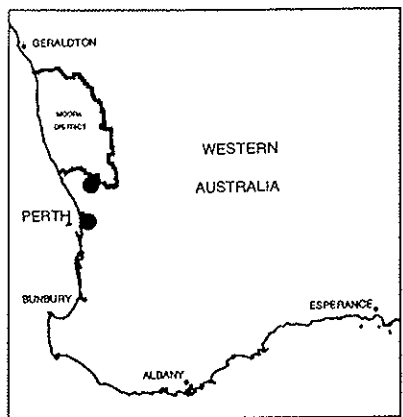
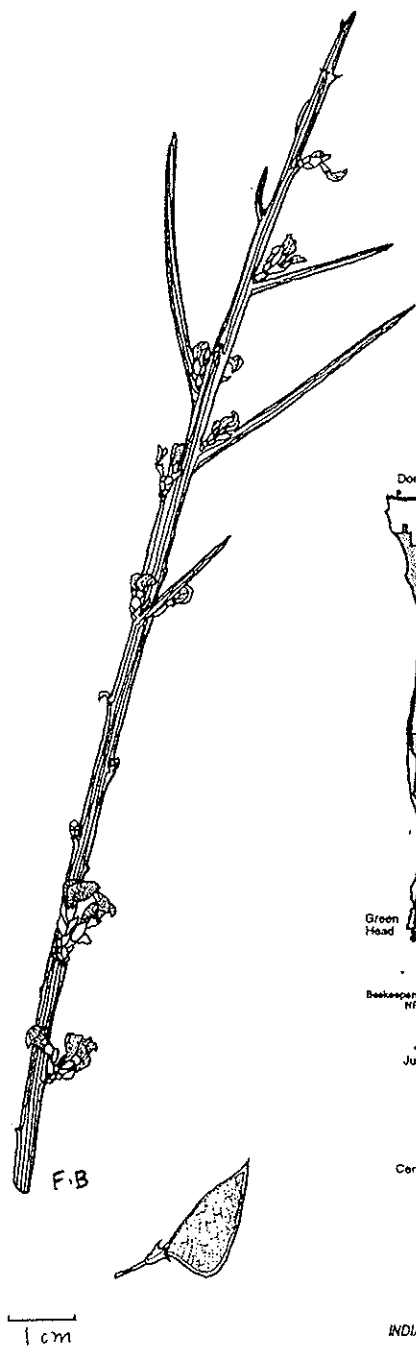
- Ensure that dieback hygiene procedures are carried out at all populations.

### **Research Requirements**

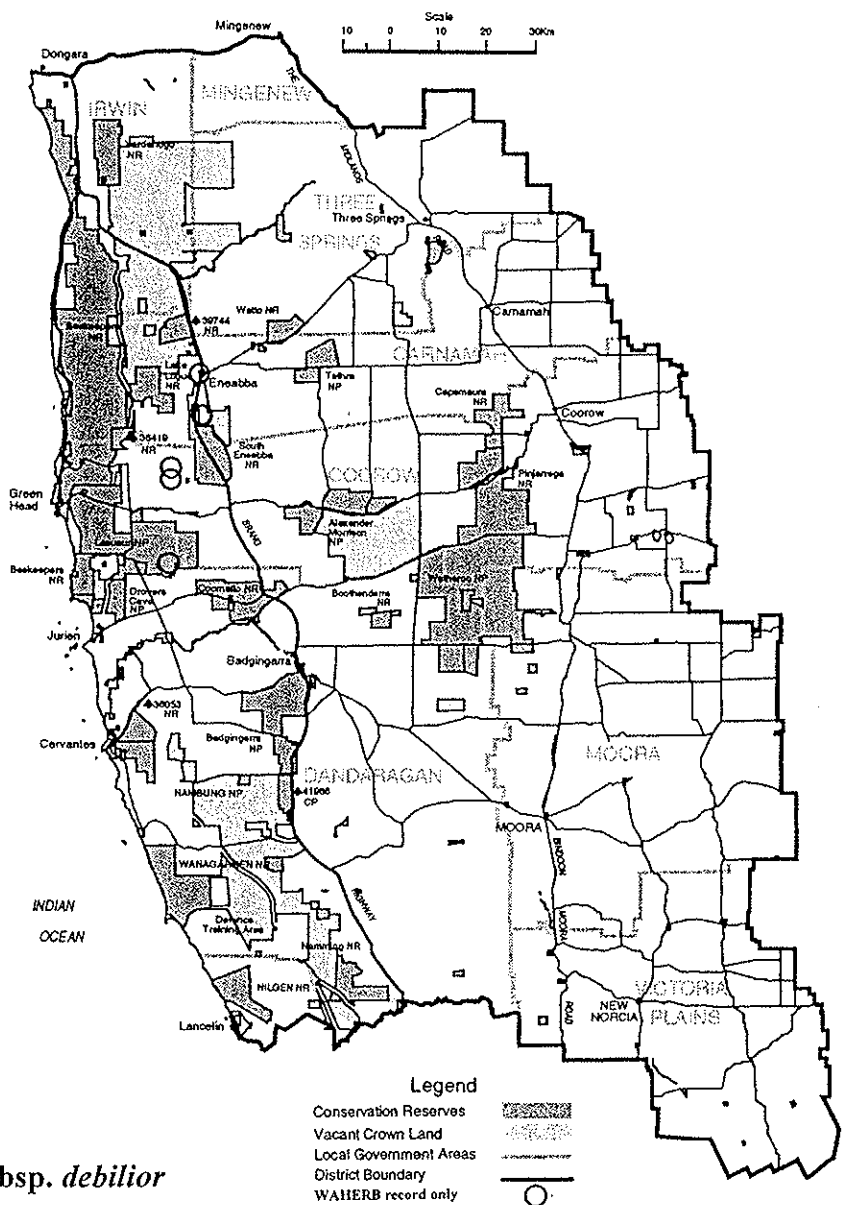
- Further survey is required.

References

Crisp (1982, 1995), Marchant *et al.* (1987).



Locality Map



● *Daviesia debilior* subsp. *debilior*

A divaricate shrub to 90 cm by 180 cm in diameter. The branchlets are somewhat spinescent and they and usually the phyllodes are tomentose with short grey, recurved hairs. Plants in more southerly populations are less hairy. The phyllodes are flattened and obliquely obovate with a pungent point. They are small, 2-4 mm x 1-3 mm. and have one or two prominent nerves. There are no stipules.

The flowers are small, borne singly in the axils of the upper leaves. The calyx has lobes much shorter than the tube. The perianth is 5-6 mm long, orange and red in colour. The outer part of the standard is orange or orange-red, the inner part and the wings and keel are dark red. The fruit is a triangular pod with convex valves ca. 1 cm long.

There has been confusion of this species in the past with *Daviesia tomentella* ms which was used in reference to the hairy as opposed to the glabrous forms of *D. dielsii*.

**Flowering Period:** July-August

**Fruiting Period:** October

#### Distribution and Habitat in the Moora District

Known populations are located north of Moora and east of Watheroo. The species has been collected in the past from further south in the Koojan area and further north near Marchagee, but extensive survey in southern part of the range has failed to re-find any of those populations.

Grows on flat or upland areas on brown loam with chert, yellow-brown sand and gravel, clayey sand, or grey sandy loam over gravel. It occurs in tall heath over low scrub or in low heath with open shrub mallee. Associated species include *Actinostrobus* sp., *Allocasuarina campestris* and *Eucalyptus rhodantha*.

#### Conservation Status

Current: Priority 2<sup>#</sup>

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. NE of Watheroo	M	Private	5.8.1993	20+	Healthy, regenerating from fire
2. N of Moora	M	Railway Reserve	16.10.1991	700 est.	Undisturbed
3. NE of Watheroo	M	Private, Proposed Nature Reserve	22.8.1991	43	Not in good condition, but area in process of rehabilitation
4.* N of Marchagee	Co	-	22.7.1977	-	-
5.* S of Marchagee	Co	-	29.5.1977	-	-
6.* S of Koojan	M	-	4.10.1977	-	-
7.* E of Watheroo	M	-	16.7.1980	-	-
8.* S of Namban	M	-	2.7.1978	-	-

#### Response to Disturbance

Plants at population 1 were regenerating well after fire.

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

## Susceptibility to *Phytophthora* Dieback

Presumed susceptible

### Management Requirements

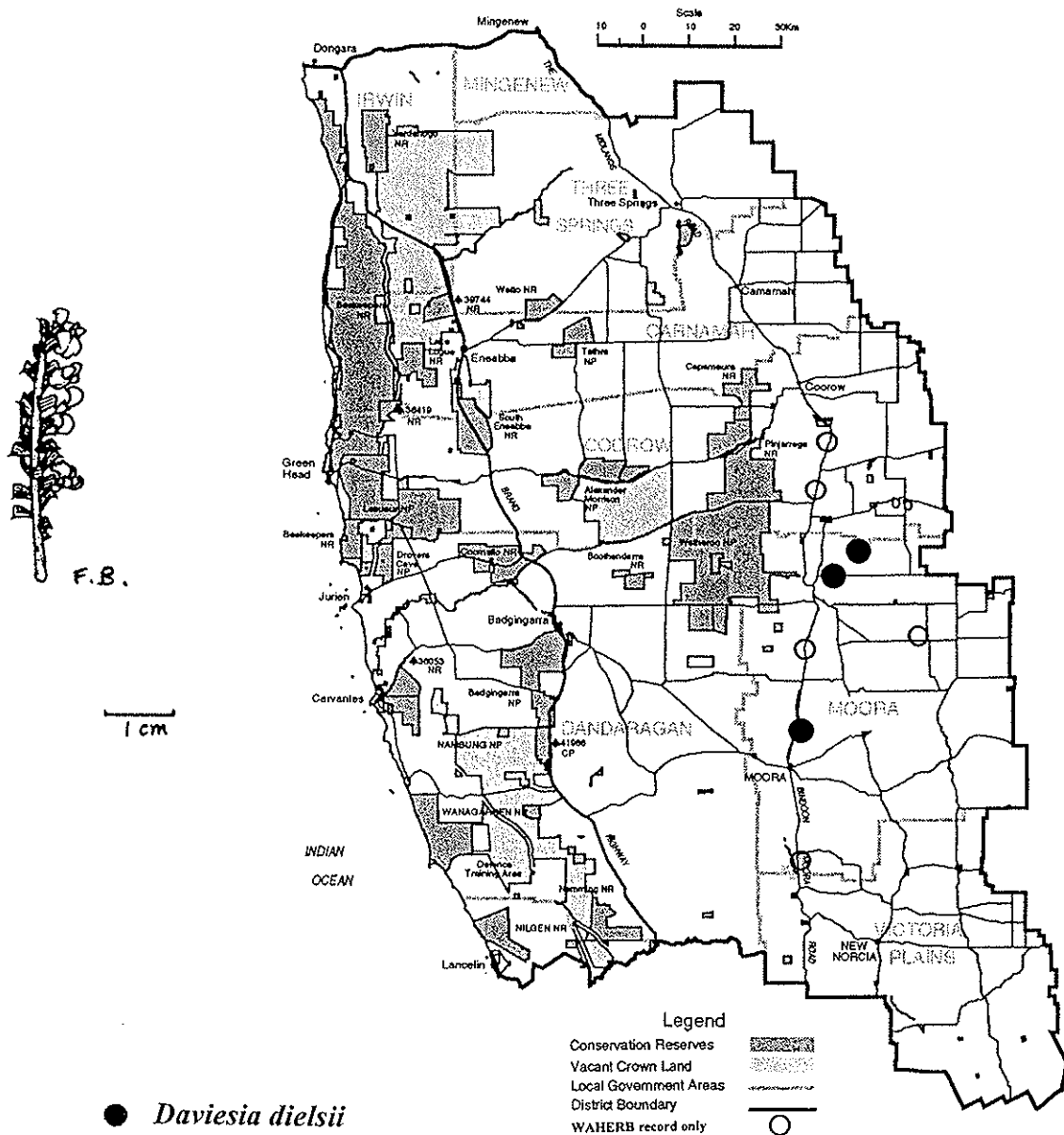
- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### Research Requirements

- Further survey is required.

### References

Crisp (1995), Diels and Pritzel (1904).



*Dryandra platycarpa* A.S.George

PROTEACEAE

[*Dryandra* sp. Watheroo (R.D.Royce 9625), *Dryandra* sp. 32]

An erect, shrub to 1.5 m, with columnar branches and without a lignotuber. The leaves are broadly linear, 4-12 cm long, 6-17 mm wide, with revolute margins and are tomentose on the lower surface. They have 10-25 pungent lobes on each side, to 8 mm long. The inflorescence is on a short branchlet or is sessile, with many linear, silky white involucre bracts to 12 mm long. The flowers are golden yellow, the perianth cream with a golden limb, the style cream and the pollen presenter is 1 mm long. green or cream. The follicles are transversely ovate.

This species can be recognised by its pinnately divided leaves, short involucre bracts, small cream and brown flowers and broad follicles. In the southern part of the range the leaf lobes may be broader and there is variation in flower size.

**Flowering Period:** July-October

**Distribution and Habitat in the Moora District**

Occurs from east of Eneabba south to Mogumber. This species is well represented on conservation reserves.

Grows on flat to undulating sites, mid slopes or hilltops, sometimes in swampy areas. Occurs in heath or tall shrubland in brown, grey to white sandy soil, sometimes with lateritic gravel. Associated species include species of *Adenanthos*, *Xylomelum*, *Hakea*, *Banksia* and *Eucalyptus todtiana*.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Coalara Road intersection	D	National Park, Shire Road Verge	8.10.1991	5+	Undisturbed
2. Alexander Morrison	Co	National Park	14.8.1991	1+	Undisturbed
3. S of Moora	D	Shire Road Verge	12.12.1990	1	Undisturbed
4. Alexander Morrison	Co	National Park	7.11.1991	3-4	Undisturbed
5. Alexander Morrison	Co	National Park	14.8.1991	1	Undisturbed
6. Cadda Road	D	National Park	6.1.1992	1	Undisturbed
7. Marchagee Track	D	VCL, Shire Road Verge	29.4.1992	50+	Undisturbed
8. Watheroo National Park	Co	National Park	29.4.1992	5	Some disturbance
9. Watheroo National Park	Co	National Park	20.11.1992	5+	Undisturbed
10. Watheroo National Park	Co	National Park	19.11.1992	5+	Undisturbed
11. N of Marchagee Track	Co	VCL	19.11.1992	2	Undisturbed
12. Capitella Road junction	D	Shire Road Verge	12.12.1990	1+	Undisturbed
13.* Strathmore Road.	D	-	17.9.1976	-	-
14.* Near Tathra	Ca	-	3.8.1983	-	-
15.* E of Dewar Road	-	-	2.8.1983	-	-
16.* Alexander Morrison	Co	National Park	2.1.1979	-	-
17.* E of Clarke Road	Ca	-	3.8.1983	-	-
18.* W of Mogumber	D	-	25.9.1965	-	-
19.* SW of Watheroo	D	National Park	6.10.1971	-	-
20.* Tootbardie Road junction	Co	-	5.8.1986	-	-
21.* SE of Tathra	Co	-	17.9.1987	-	-



## Response to Disturbance

Unknown

## Susceptibility to *Phytophthora* Dieback

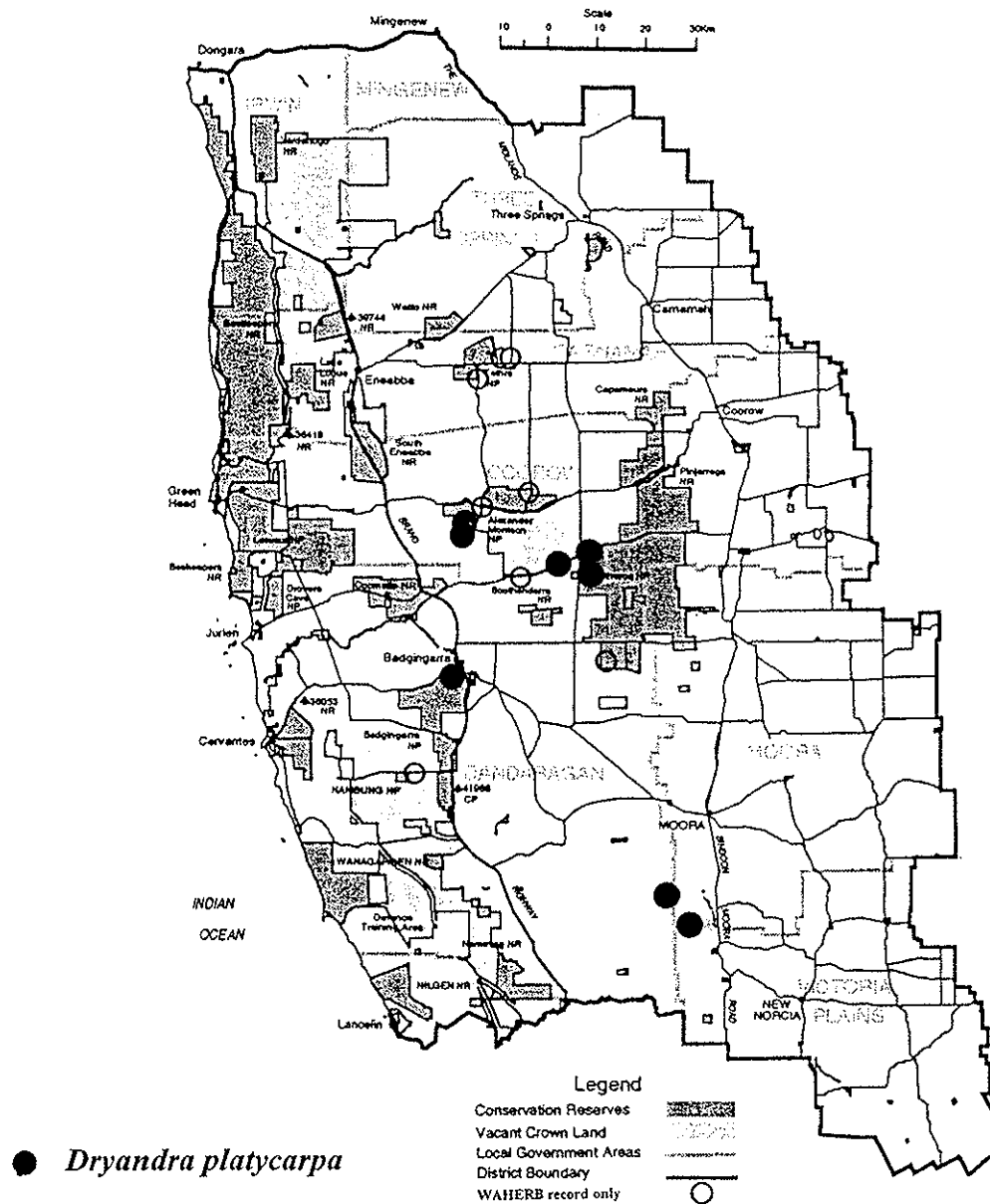
Presumed susceptible

## Management Requirements

- Monitor populations at regular intervals.
- Ensure that dieback hygiene procedures are carried out at all populations.

## References

George (1996).



*Epitriche demissus* is a low annual herb 2-5 cm high with stems which are simple or branching at the upper nodes. The leaves are opposite, sessile and lanceolate, with few hairs, 0.5-1 cm long. The flowers are in compound heads, with an involucre of bracts, the outer leaf-like, the inner ones densely hairy. There are 10-20 flowers per head, each with a tubular five lobed corolla to 1.9 mm long. The fruit is an achene, which has a tuft of long hairs at the apex giving the clusters of flower heads a woolly appearance.

The monotypic genus *Epitriche* is allied to *Angianthus* and this species was included in that genus until the account of *Epitriche* was published in 1983.

**Flowering Period:** July-September

**Distribution and Habitat in the Moora District**

*E. demissus* is known from two populations ca. 6 km apart, in the Three Springs area. It has also been collected from ca. 40 km north-east of this in the Geraldton District.

Grows on the margins of saltlakes in sand or clayey sand with other low herbs, and just below open woodland of *Acacia acuminata* with scrub beneath or with *Halosarcia* species only.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

---

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. S of Three Springs	TS	Nature Reserve	17.8.1993	10000+	Undisturbed
2. SE of Three Springs	TS	MRWA Road Verge, Private	19.9.1991	1000+	Partly disturbed

---

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

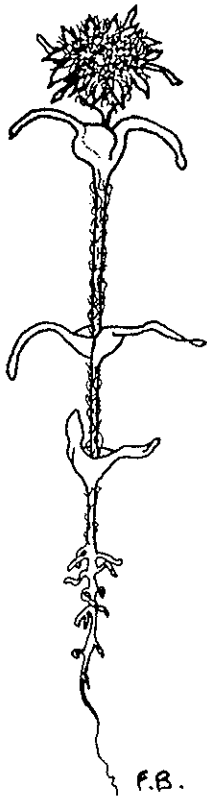
- Ensure that the road verge population is marked.
- Maintain liaison with landowner.
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

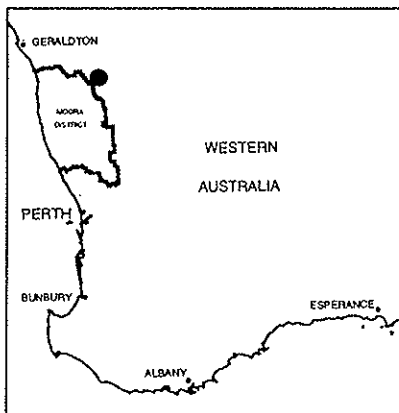
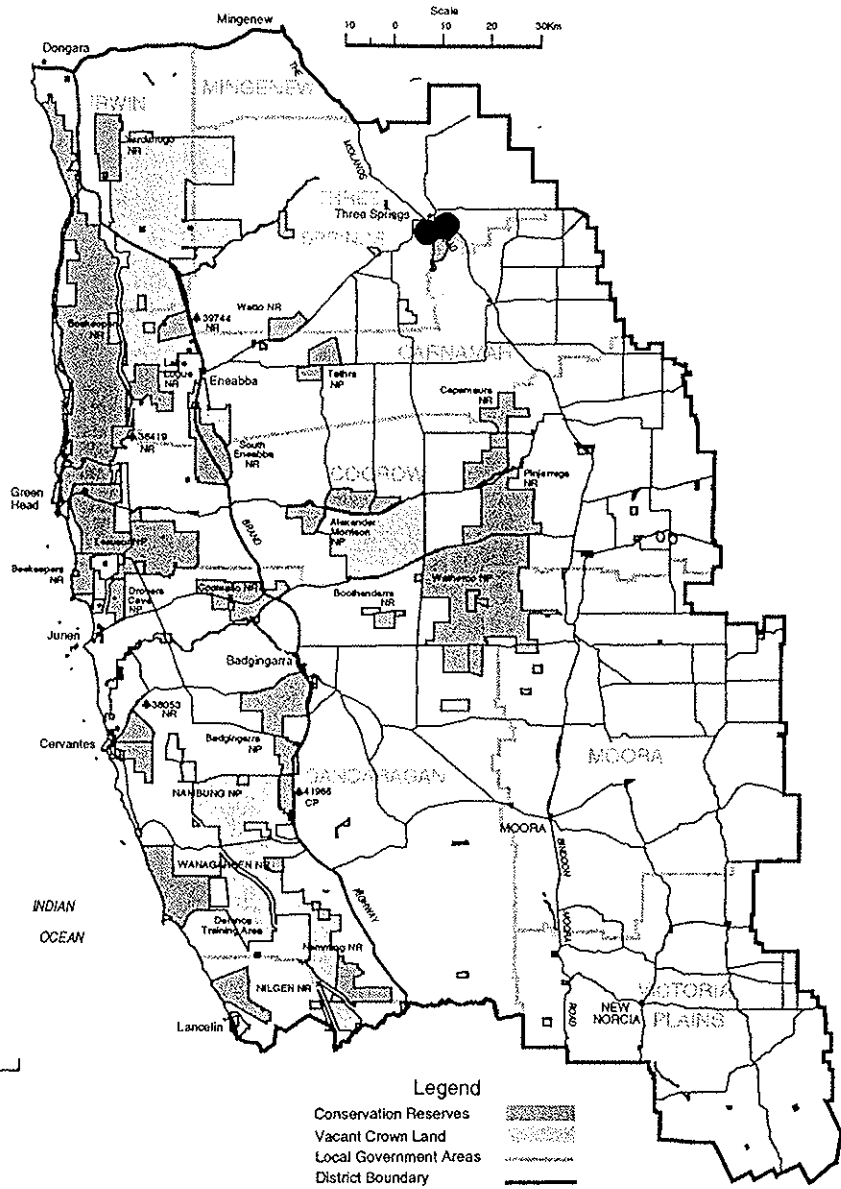
- Further survey is required around the edges of saltlakes which are extensive in the areas of occurrence.

**References**

Bentham (1866), Grieve and Blackall (1982), Short (1983).



1 cm



Locality Map

● *Epitriche demissus*

This species was first collected in 1970 but not recognised until 1988 and described in 1991.

*Eucalyptus abdita* is a mallee to 3 m tall with smooth grey stems. The leaves are at first blue-green, maturing to green and slightly glossy. They are lanceolate in shape, up to 9 cm long and 2 cm broad. The inflorescence has up to 13 flowers, each with a short stalk and the inflorescence has a peduncle up to 1 cm long. The buds are spindle-shaped, 1.4 cm x 0.3 cm, the operculum equal in diameter to the hypanthium and with an acute tip, which is sometimes slightly recurved. The fruits are up to 0.6 cm long x 0.4 cm.

This species differs from *E. pluricaulis* in its shorter, less tapering buds, and in the green, slightly glossy mature leaves, which contrast with the dull blue-green new growth. The specific name comes from the Latin for hidden or concealed, as this species was at first overlooked and thought to be *E. pluricaulis*.

**Flowering Period:** July-September

#### Distribution and Habitat in the Moora District

*E. abdita* has been recorded from five disjunct populations over a geographic range of over 100 km from the Dandaragan area to south-west of Mingenew.

It grows on lateritic soils, sometimes near breakaways and has been recorded on yellow-brown sandy clay with gravel in open low mallee woodland over dwarf scrub with *E. leptophylla*, *Daviesia* sp. and *Calothamnus* sp. Associated eucalypts include *E. arachnaea* subsp. *arachnaea* and *E. gittinsii*.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. W of Dandaragan	D	Private	30.4.1991	10+	Partly disturbed
2. SW of Mingenew	TS	Shire Road Verge	10.7.1991	One clump	Undisturbed
3.*NW of Mt Lesueur	D	National Park	2.3.1983	-	-
4.*W of Three Springs	TS	National Park	7.1.1970	-	-
5.*E of Eneabba	Ca	-	20.8.1982	-	-

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Presumed not susceptible

#### Management Requirements

- Ensure that dieback hygiene procedures are carried out at all populations.

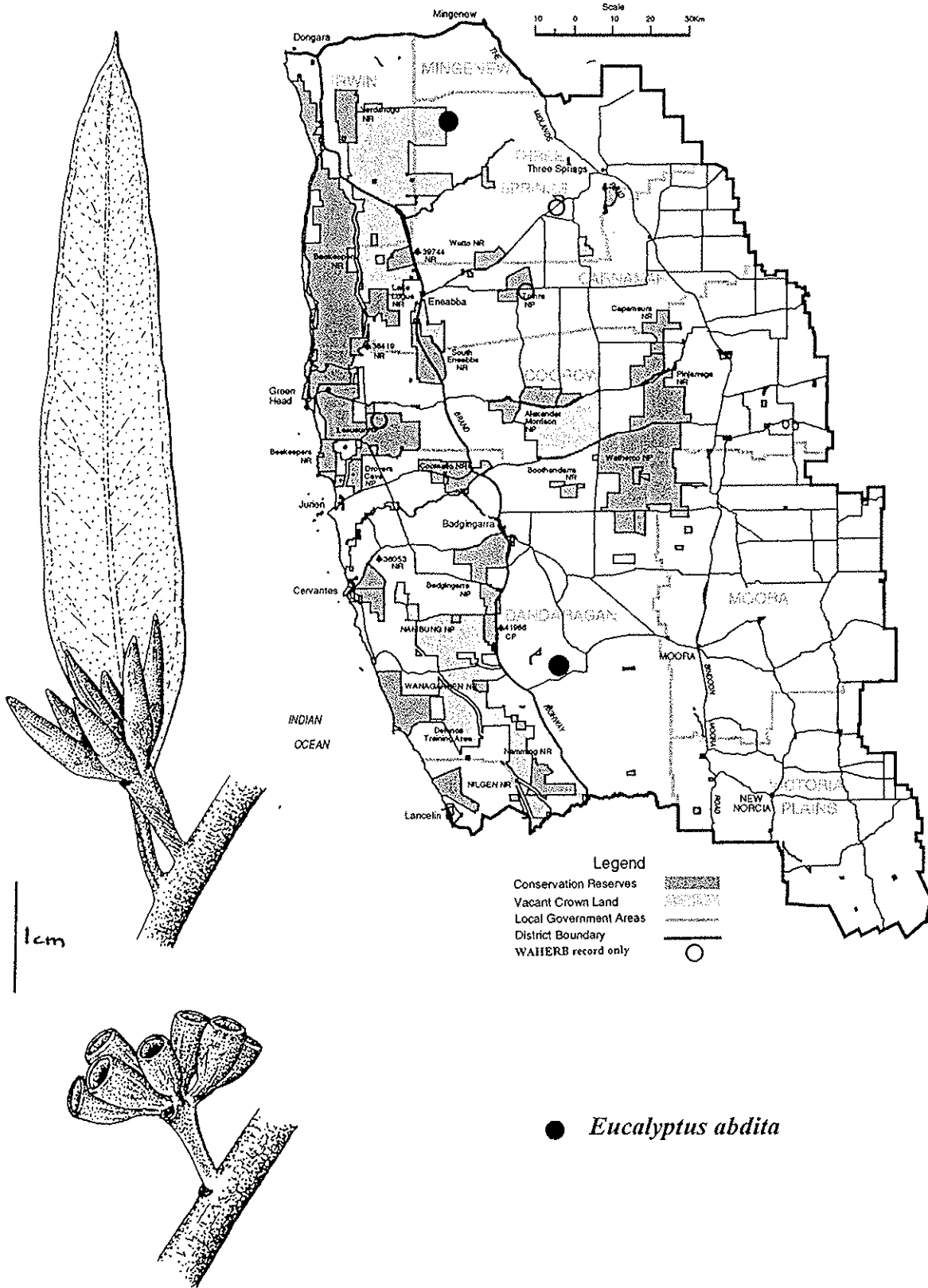
#### Research Requirements

- Further survey is required.

References

Brooker and Hopper (1991).

Illustration by J. Rainbird.



● *Eucalyptus abdita*

## *Eucalyptus angularis* Brooker & Hopper

MYRTACEAE

*Eucalyptus angularis* is a mallee to 3 m tall with rough grey bark at the base of the stems or for the first metre from the base. The branchlets are slender and angular. The leaves are small, elliptic to falcate or lanceolate in shape, 6-10 cm x 1.5 cm with minutely recurved edges. They are glossy and green and densely veined. The inflorescences are up to 11-flowered, on slender angular or flattened peduncles 1-2 cm long. The buds have stalks and are spindle-shaped but mature buds and fruits are not known.

It is thought possible that this taxon is a hybrid of *E. marginata* and possibly *E. exilis* or *E. pendens*.

**Flowering Period:** Unknown

### **Distribution and Habitat in the Moora District**

Two populations are known, one in the Lesueur area and another ca. 10 km to the south-east. Both populations occur on lateritic breakaways as a single clump of mallees emergent over low heath.

### **Conservation Status**

Current: Priority 2

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* NE of Mt Lesueur	D	National Park	1.3.1983	1	-
2.* Mt Benia	D	Education Reserve	3.3.1983	1	-

### **Response to Disturbance**

Unknown

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

Presumed not susceptible

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

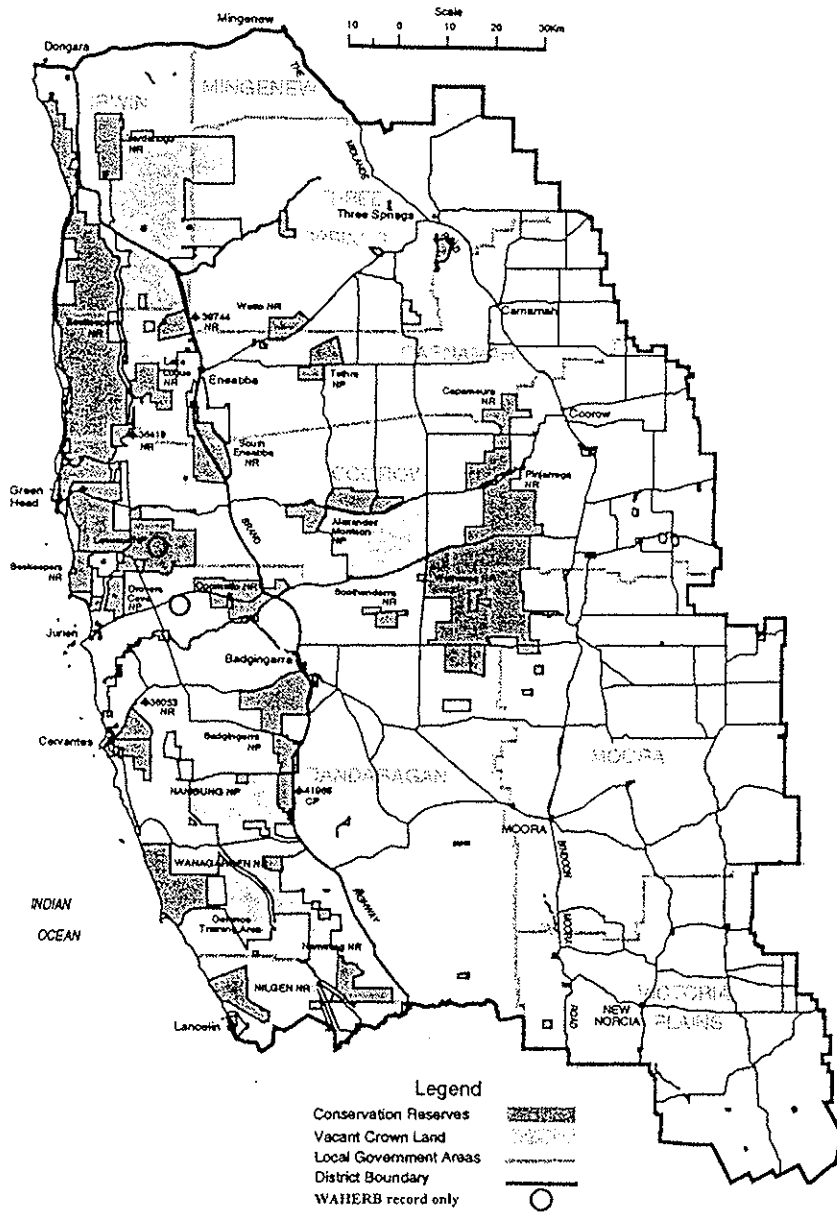
### **Research Requirements**

- Further survey is required, particularly to refind both populations. Collections of mature buds and fruits are required.

### **References**

Brooker and Hopper (1993).

Illustration by E. Cooper.



*Eucalyptus angularis*

A mallee to 5 m tall, with the stems grey in colour over smooth copper-coloured bark. The leaves are glossy and dark green in colour. The buds are pendant on slender rounded peduncles. The operculum is elongated and cylindrical with slight or no ribbing, and the fruits are cup-shaped to cylindrical.

This species is similar to *Eucalyptus stowardii* but differs in its smaller, less glossy leaves, buds and fruits and in the absence of, or reduced ribbing on buds and fruits. The coppery bark also distinguishes the species.

**Flowering Period:** May, July and September-January

#### Distribution and Habitat in the Moora District

Known from two areas, north-east of Geraldton in low stony hills, and in the Moora District from west of Three Springs over a range of 30 km and with earlier records from east of Eneabba and Jurien Bay.

Grows along drainage lines or in swampy areas on hillsides or flats, sometimes below breakaways, on quartz, sandstone or sand over laterite in grey, white or yellow-brown sand, grey sandy clay or white kaolin soil. The plants grow emergent over low scrub, in shrublands or open low woodland. Associated plants include species of *Melaleuca*, *Dryandra*, *Eucalyptus* and *Kunzea*.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Three Springs	TS	MRWA Road Verge, Private	10.7.1991	10	Area disturbed, at gateway to recently fenced block
2. W of Three Springs	TS	Shire Road Verge	3.10.1990	3	Undisturbed
3. W of Three Springs	TS	Shire Road Verge	3.10.1990	10	Undisturbed
4.* Yandanooka	TS	Nature Reserve	13.3.1986	Big population-	-
5.* Yandanooka	TS	-	21.4.1988	WH	-
6.* NNE of Eneabba	TS	-	28.5.1983	-	-
7.* E of Eneabba	Ca	-	25.7.1974	-	-
8.* Brand Highway	D	-	10.7.1973	-	-

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Presumed not susceptible

#### Management Requirements

- Ensure that dieback hygiene procedures are carried out at all populations.

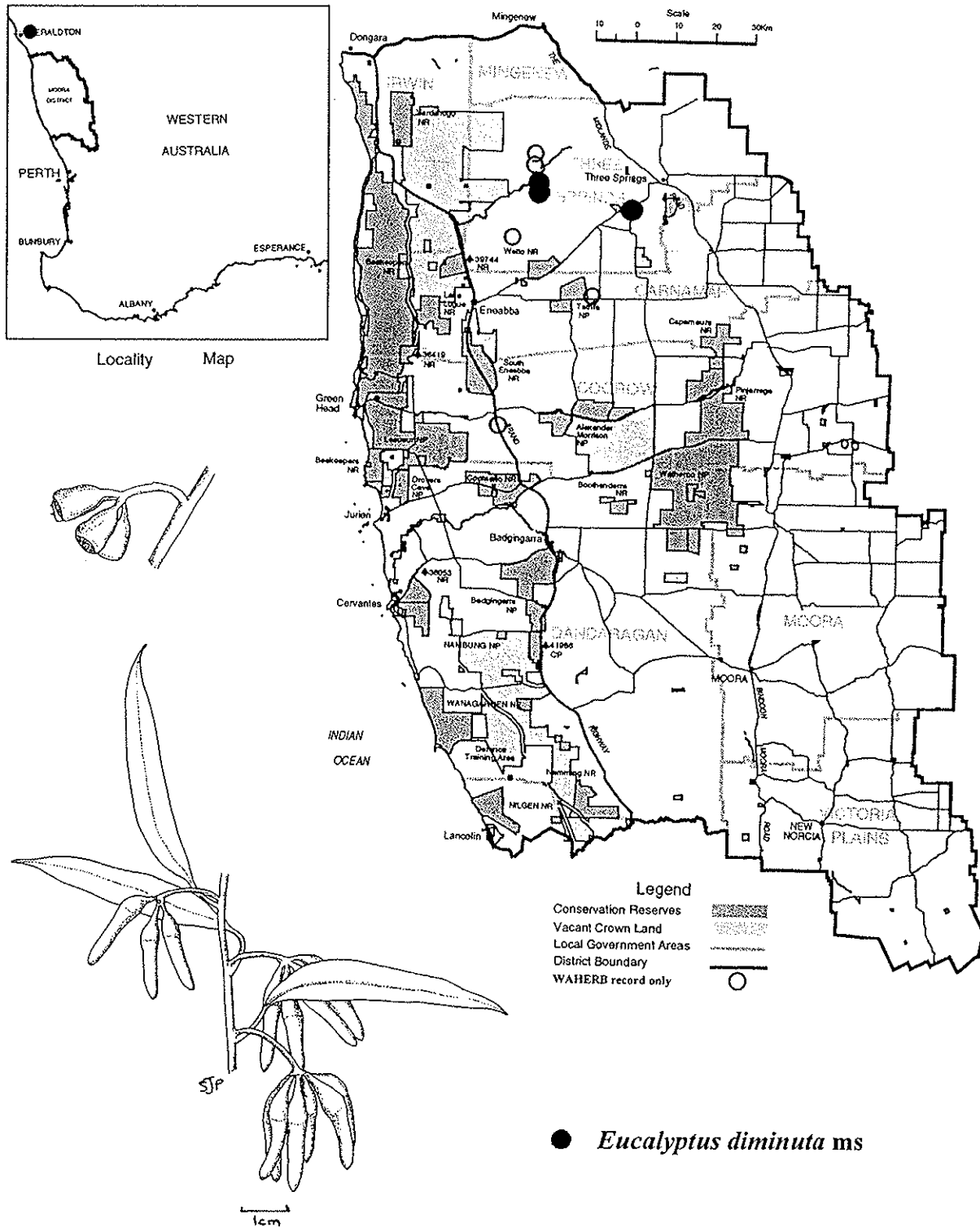


## Research Requirements

– Further survey is required.

## References

Brooker and Kleinig (1990), Napier *et al.* (1988a).



***Gompholobium* sp. Marchagee (B.R.Maslin 1427)**

FABACEAE

This undescribed taxon is known from only six collections made between 1954 and 1971.

It is a straggling shrub to 60 cm tall, with branchlets covered with short, fine, erect hairs. The leaves are short, 3-7 mm long, divided into three or more narrow lobes with blunt ends and covered with short, stiff hairs. The flowers are borne at the ends of the branches, solitary or in clusters of two or three. The flowers have pedicels 1-2 cm long with linear, fine bracteoles. The calyx is shortly hairy and the petals are pink in colour, or very pale pink, cream and black or white with purple outside. The keel and wings are about equal in length.

This taxon has been confused with *Gompholobium aristatum*. The latter differs in its short pedicels, stiff, tapering bracteoles, yellow flowers with the keel longer than the wings, pointed, sparsely hairy leaves and branchlets with long, soft hairs.

Another, more common taxon similar to *G.* sp. Marchagee has longer leaves and a more densely hairy calyx with long, soft hairs. See E.A.Griffin 5560.

**Flowering Period:** Late September-November

**Distribution and Habitat in the Moora District**

Occurs between Moora and Coorow.

Has been recorded growing in yellow sand, and sandheath.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* W of Watheroo	-	National Park	6.10.1971	-	-
2.* W of Coorow	-	-	25.9.1962	-	-
3.* Watheroo	Mo	-	4.11.1954	-	-
4.* W of Coomberdale	-	-	2.11.1974	-	-
5.* S of Marchagee	Co	-	20.10.1970	-	-
6.* W of Coorow	Co	-	30.9.1966	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

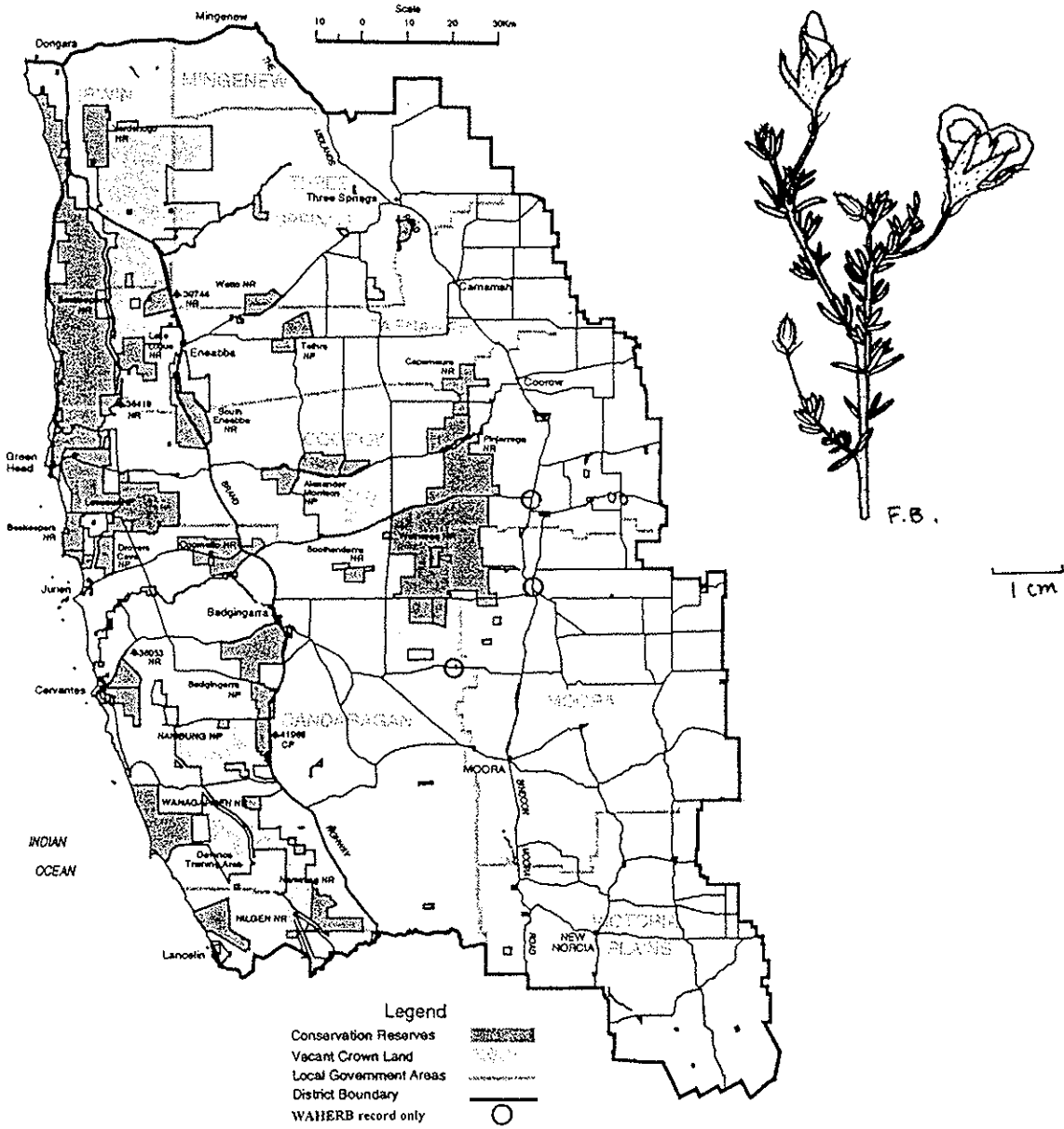
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required particularly in the area between Moora and Coorow on sand heaths, in order to determine the conservation status of the taxon.
- Further taxonomic work is required in this group.

**References**

E. Griffin (personal communication), Marchant *et al.* (1987).



*Gompholobium* sp. Marchagee (B.R.Maslin 1427)

## *Goodenia trichophylla* de Vriese ex Benth.

## GOODENIACEAE

*Goodenia trichophylla* was described in 1868 by Bentham from specimens collected by James Drummond in south-western Western Australia.

*G. trichophylla* is an erect herb, to 30 cm tall. The basal leaves are tufted, linear, 2-4 cm long, ca. 2 mm wide. The flowering stems have leaf-like bracts, which are smaller than the leaves. The flowering section of stem is up to 20 cm long. The flowers are in clusters of up to three on stalks to 9 mm long, each flower stalk thread-like, to 5 mm long. The sepals are narrow, to 1.5 mm long. The flowers are blue, or pink with a yellow throat or purplish-blue with a white throat, to 12 mm long, with five winged lobes.

The plant is covered with a viscid varnish when mature, with appressed peltate hairs.

This species is closely related to *G. caerulea* and *G. glareicola* but differs in its peltate hairs, which are hidden by the secretion of viscid varnish. These hairs cover the younger leaves and outside of the flowers. There are also simple hairs on the calyx and corolla and the flower is smaller.

A specimen collected from north-east of Eneabba closely approaches this species but has little viscid varnish.

**Flowering Period:** November-December

### **Distribution and Habitat in the Moora District**

Two collections from the Moora District occur over a range of 30 km north and east of Eneabba. Only one population, occurring north-east of Eneabba has been seen recently.

This species is also known from two collections made 500 km to the south-east in the Lake King to Ravensthorpe area in 1983 and 1986, growing in brown clayey sand with lateritic gravel in shrubland with *Malleostemon roseus* and *Callitris*, *Hakea* and *Verticordia* species.

Has been recorded in the Moora District growing in grey sand and lateritic gravel in regenerating heath and low heath with *V. grandis*, *Hakea* sp. and *Xanthorrhoea* sp.

### **Conservation Status**

Current: Priority 2

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. NE of Eneabba	TS	Shire Reserve	24.11.1993	1	Healthy
2.* E of Eneabba	Ca	National Park	11.11.1978	-	-

### **Response to Disturbance**

Population 1 was growing in an area which had been burnt the previous summer.

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

Unknown

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

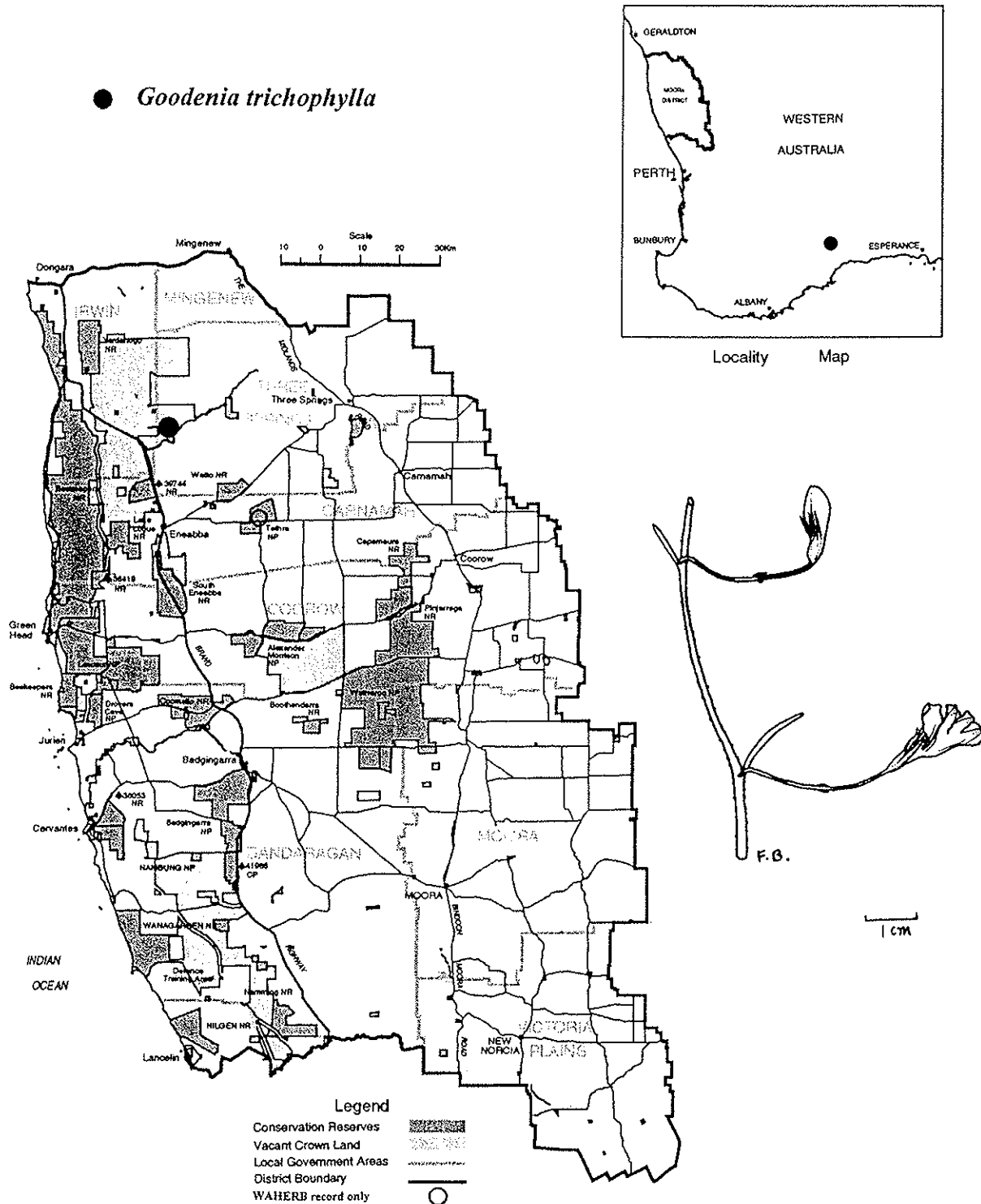
**Research Requirements**

- Further survey is required.
- Further taxonomic work is required to clarify the relationship of this species with closely related taxa.

**References**

Bentham (1868), Carolin (1990a, 1992).

● *Goodenia trichophylla*



*Grevillea biformis* Meisn. subsp. *cymbiformis* P.Olde & N.Marriott    PROTEACEAE  
[*Grevillea integrifolia* subsp. Eneabba (P.Olde 91/103)]

An upright shrub 1-1.7 m tall. The leaves are boat-shaped and flattened, obovate in shape with the upper surface hairless, the lower surface silky-hairy. The inflorescence is a cluster of several racemes of flowers, each raceme 8-13 cm long. The flowers are creamy-white in colour, each ca. 5 mm long. The fruits are 10-12 mm long, 3-4 mm wide, obovate in shape, with a rough surface.

This subspecies differs from subsp. *biformis* in the obovate, not linear leaves, with one surface glabrous, and in the wider fruit. The leaves are similar to the juvenile leaves of *Grevillea biformis*, but at the type location a number of plants have some leaves approaching those of *G. biformis*, which indicates that the two taxa are conspecific (Olde and Marriott 1995).

**Flowering Period:** Spring-summer

**Distribution and Habitat in the Moora District**

This subspecies occurs in a small area to the south-south-west of Eneabba. There are also two specimens in the Western Australian Herbarium from the Wongan Hills area, one of which is recorded from a road verge.

It grows in yellow-brown, grey or white sand, in low heath with *Grevillea integrifolia*, *G. althoferorum*, *Verticordia grandis*, *Hakea prostrata* and *Jacksonia* sp.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Eneabba	Ca	Shire Road Verge	30.5.1994	5+	Undisturbed
2.* W of Eneabba	Ca	-	27.2.1981	-	-
3.* S of Eneabba	Ca	-	28.9.1979	-	-
4.* S of Eneabba	Ca	?Nature Reserve	22.3.1981	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

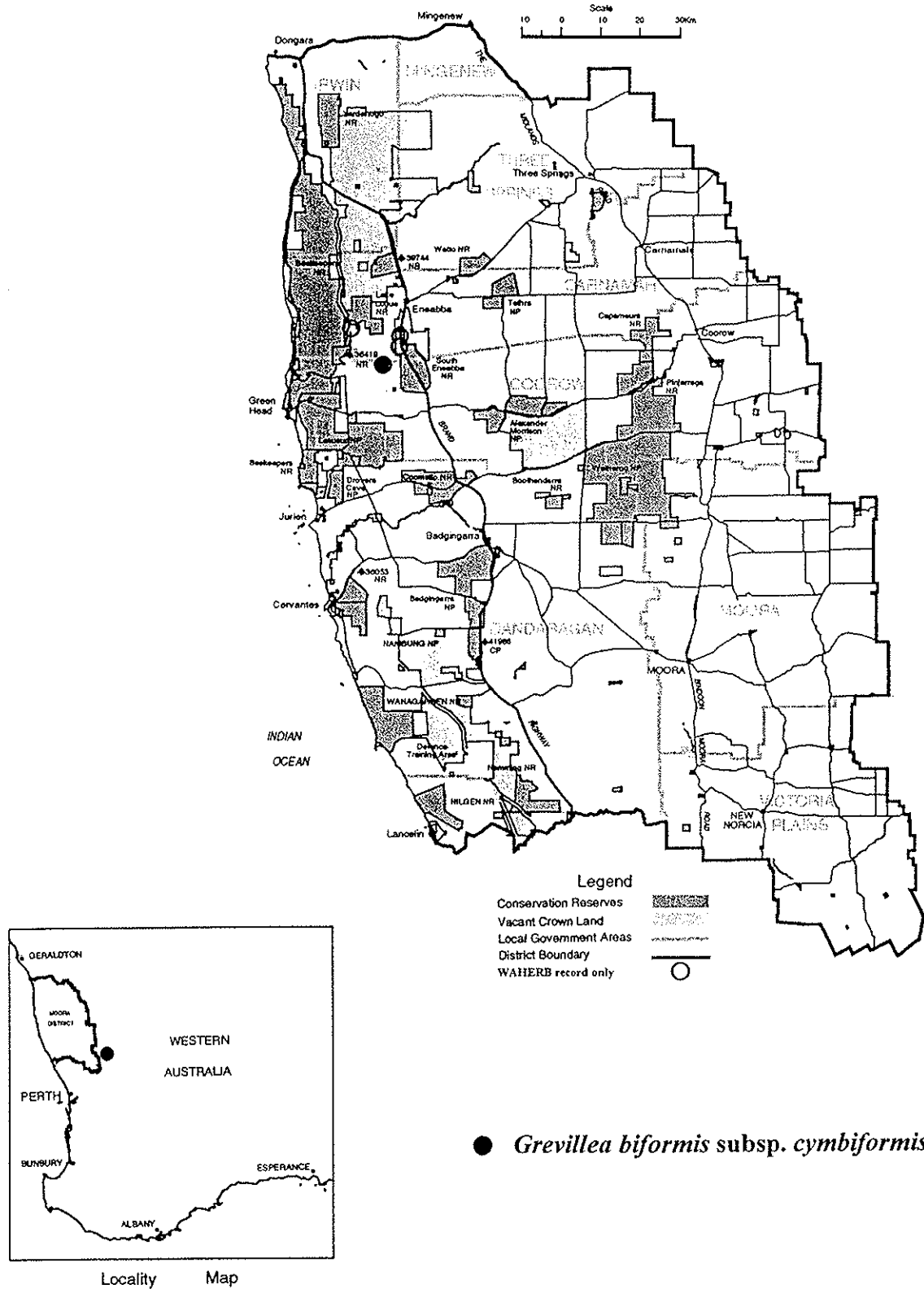
- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that road verge population has markers present.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

**Research Requirements**

- Further survey is required.

## References

Olde and Marriott (1995).



*Grevillea bracteosa* Meisn.

## PROTEACEAE

## Bracted Grevillea

An erect loose shrub to 1-2 m tall, with narrow leaves which are usually simple but are rarely divided from near the base into two or three linear segments. They are 5-25 cm long, 1-3 mm wide, without hairs. The margins are rolled over and the midvein is only evident on the lower surface, with two lateral veins evident on either side of the midvein on the upper surface. The inflorescences are terminal, 3-9 cm long, globular in shape. The floral bracts are broad and conspicuous on the buds, 7-14 mm long, elliptic to obovate in shape. The flowers are hairless on the outside, pink, purplish-pink or pale mauve in colour (a white-flowered form occurs near Miling) and they are smaller from the southern part of the species range in the Moora District than from those in populations further north.

The pistil including ovary is glabrous, 17-23 mm long, with a transverse torus. The fruits are erect, to 15 mm long and 5 mm wide.

The collection from New Norcia has unusually short pistils, 11-12 mm, longer leaves and the perianth appears pubescent, but Olde and Marriott (1995) state that the differences in the small conflorescence form found in the south of the range are inconsistent and do not warrant formal infraspecific recognition.

**Flowering Period:** September-December in the Moora District, August-October in the Geraldton District

**Distribution and Habitat in the Moora District**

This species was described from material collected by James Drummond. It is known from the Geraldton District, between the Moresby Range, north of Geraldton to Mullewa, and near Morawa, a geographic range of ca. 140 km. There are also records from a few localities further south in the Moora District, from Mogumber and New Norcia and north-east of Moora.

*Grevillea bracteosa* is recorded growing in rugged, stony soil on hills and on granitic loam in heath or tall shrubland, growing with *G. petrophiloides* in the Moora District. In the Geraldton District it has been recorded from grey sandy loam in closed scrub, gravelly clay, gravelly sand, sand and sand over gravel.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Miling	Mo	Private	21.9.1991	500	Diseased
2.*Near Mogumber	VP	-	12.1962	-	-
3.*New Norcia	VP	-	11.1918	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible



### Management Requirements

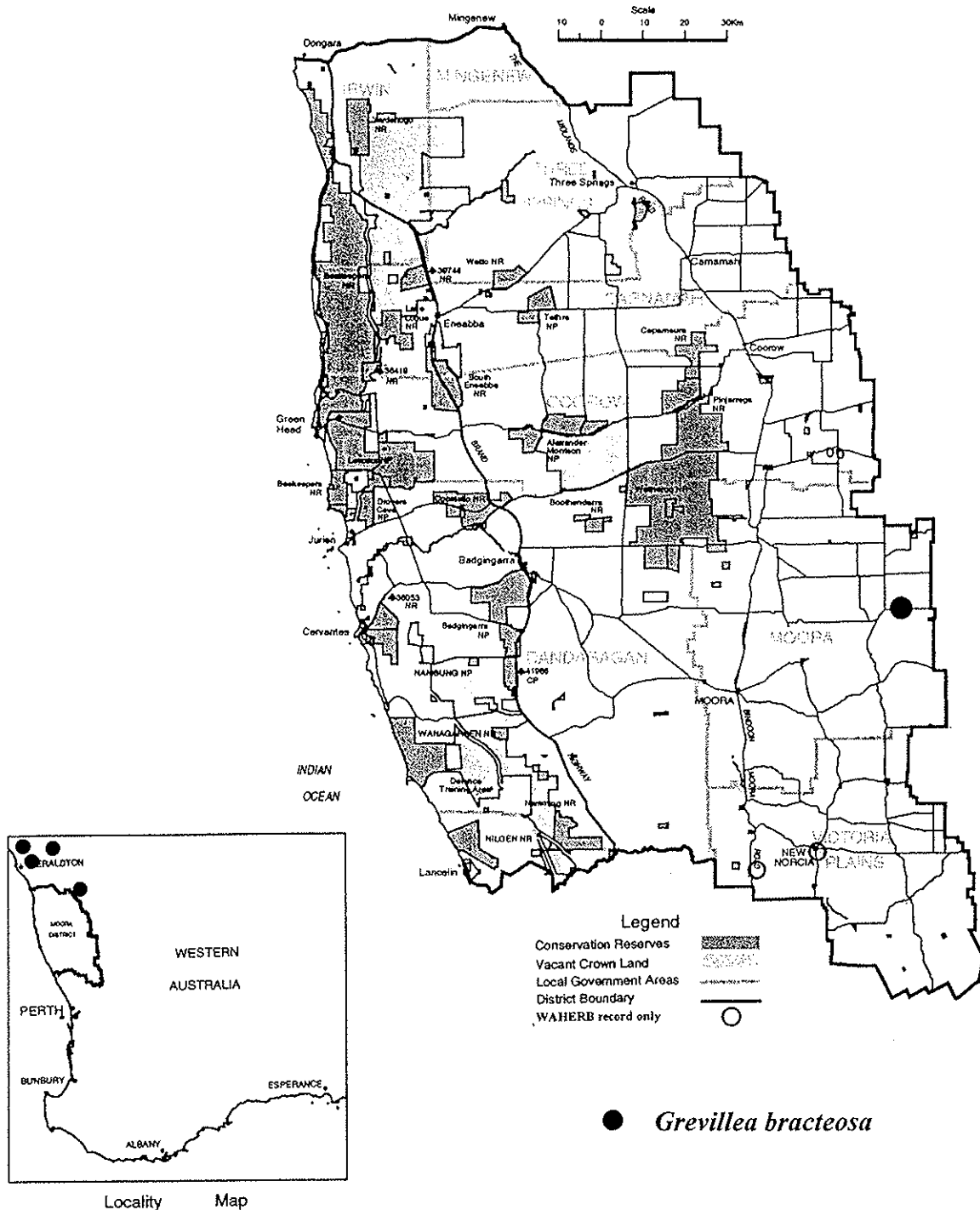
- Population 1 requires monitoring.
- Ensure that dieback hygiene procedures are carried out at all populations.

### Research Requirements

- Further survey is urgently required.

### References

Bentham (1870), Lehmann (1848), McGillivray (1993), Olde and Marriott (1995).



The earliest collection of *Grevillea makinsonii* was made in 1903 by W.V. Fitzgerald from Arrino, but the species was not described until 1986.

*G. makinsonii* is a shrub to 1.6 m, the leaves with a short petiole, obovate with flat margins and a blunt apical point. They are silky-hairy with a dense, appressed indumentum, and are 1-3 cm long and 3-8 mm wide. The flowers are in erect, usually terminal spikes, 3-7.5 cm long, the flowers with pedicels 2.7-4.3 mm long. The perianth limb is nodding to declined in bud, 1.3-1.4 mm long, the outside of perianth glabrous, pale yellow in colour. The ovary is glabrous, the pollen presenter cone-shaped. The fruits are 6 mm x 4.5 mm with a rough dark brown to black surface.

Most of the earlier collections were identified as *G. integrifolia* which has the perianth limb straight and erect in bud. It has also been confused with *G. polybotrya* which has glabrous or sparsely hairy leaves and flowers which are sometimes hairy on the outside and which have pedicels less than 1 mm long.

**Flowering Period:** July-October

#### Distribution and Habitat in the Moora District

Occurs from Arrino westwards and south to east of Eneabba over a geographic range of ca. 45 km. Most known populations have been found recently.

Grows in clay, loam or sand over laterite, emergent in low heath on hill slopes, or in sandy loam and laterite in low, open mallee woodland and scrub.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Arrino	TS	Nature Reserve, Shire Road Verge	3.10.1990	500	Good
2. SW of Arrino	TS	Shire Road Verge	3.10.1990	10	Disturbed
3. SW of Three Springs	TS	Nature Reserve	22.10.1992	9+	Undisturbed
4. SW of Three Springs	TS	Nature Reserve	22.10.1992	5+	Undisturbed
5. SW of Three Springs	TS	Nature Reserve, Shire Road Verge	22.10.1992	22+	Partly disturbed
6. SW of Three Springs	TS	Shire Road Verge	22.10.1992	30+	Partly disturbed
7. SW of Three Springs	TS	Shire Road Verge	22.10.1992	5+	Undisturbed
8. SE of Arrino	TS	MRWA Road Verge	18.8.1993	1	Healthy, but on very narrow road verge
9. SW of Three Springs	TS	Shire Road Verge	18.8.1993	6	Undisturbed
10. SW of Three Springs	TS	Shire Road Verge	18.8.1993	50+	Undisturbed
11. SW of Three Springs	TS	Shire Road Verge	18.8.1993	5+	Undisturbed
12. E of Eneabba	Ca	Shire Road Verge	18.8.1993	20 est.	Healthy
13.* Arrino	TS	-	1969	-	-
14.* W of Watheroo	-	-	23.9.1926	-	-

#### Response to Disturbance

Unknown

## Susceptibility to *Phytophthora* Dieback

Presumed susceptible

## Management Requirements

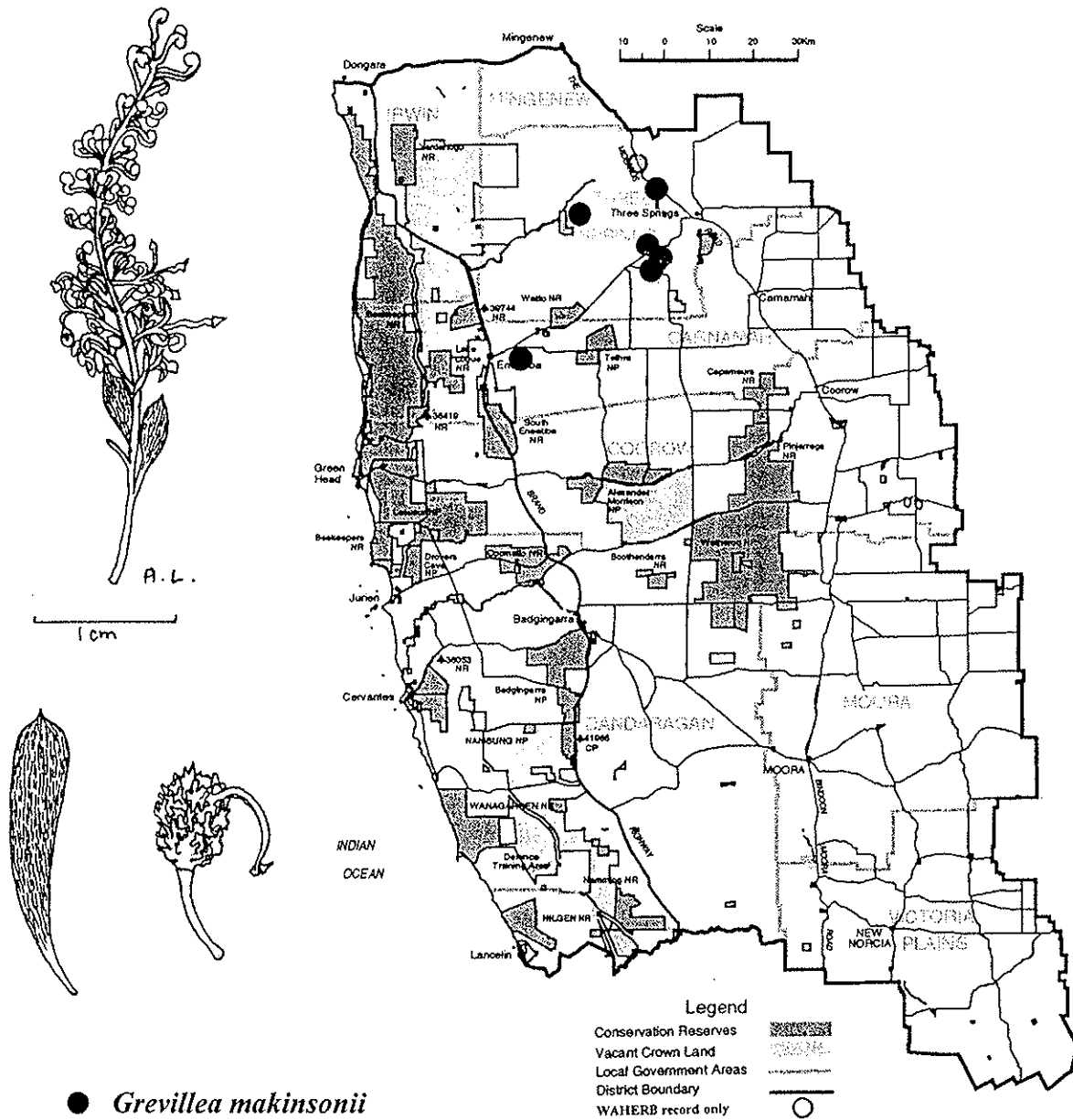
- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that markers are in place at all road verge populations.

## Research Requirements

- Further survey is required in the Watheroo and Arrino areas.

## References

McGillivray (1986), Olde (1986), Olde and Marriott (1995).



● *Grevillea makinsonii*

***Grevillea synapheae* R.Br. subsp. *pachyphylla* Minyolo variant  
(S.Patrick & A.P.Brown SP 1139)**

PROTEACEAE

[*Grevillea pieronii* Olde & Marriott ms]

A compact low shrub to 30-60 cm tall and 1-2 m wide with a lignotuberous habit and numerous branches arising from the base. The upper leaves below the flower heads are much smaller than lower leaves which are deeply divided with seven or fewer narrow primary lobes, sometimes with secondary divisions. They are leathery with strongly recurved margins. The floral bracts are not shed before the flowers open. Each flower head is dense and up to 6 cm long, borne conspicuously above the leaves. The flowers are creamy-yellow in colour. The pollen presenter is short and has a slight basal collar. The fruits are 8-13 mm long, rounded with a blunt apex.

This taxon was included in the Declared Rare and Priority Flora List for 1992 as *Grevillea pieronii* ms. Olde and Marriott (1993) stated that the differences between this form and *G. synaphea* subsp. *pachyphylla* are not sufficiently clear to warrant separate ranking at this stage and in their publication it is treated informally as the Minyolo form of subsp. *pachyphylla*.

It differs from *G. synapheae* subsp. *pachyphylla* in the lignotuberous habit, reduced upper leaves, conspicuous inflorescences, deeply divided leaves and short pollen presenter.

**Flowering Period:** August-September

**Distribution and Habitat in the Moora District**

Has been collected over a range of 25 km to the west of Dandaragan. Occurs in low open heath and open low woodland, on gravelly lateritic rises and grey sand above small creeks. Associated species include *Eucalyptus todtiana*, *Allocasuarina humilis* and *Gastrolobium spinosum*.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Minyulo	D	Shire Road Verge	27.8.1992	5+	Undisturbed
2. Minyulo	D	Shire Road Reserve	5.8.1992	1	Undisturbed
3. Minyulo	D	Shire Road Verge	5.8.1992	4	Undisturbed
4.* Mullering Road	D	-	14.9.1991	-	-
5.* NW of Dandaragan	D	Private	11.8.1988	-	-
6.* S of Minyulo Brook	D	Shire Road Verge	20.9.1990	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

### Management Requirements

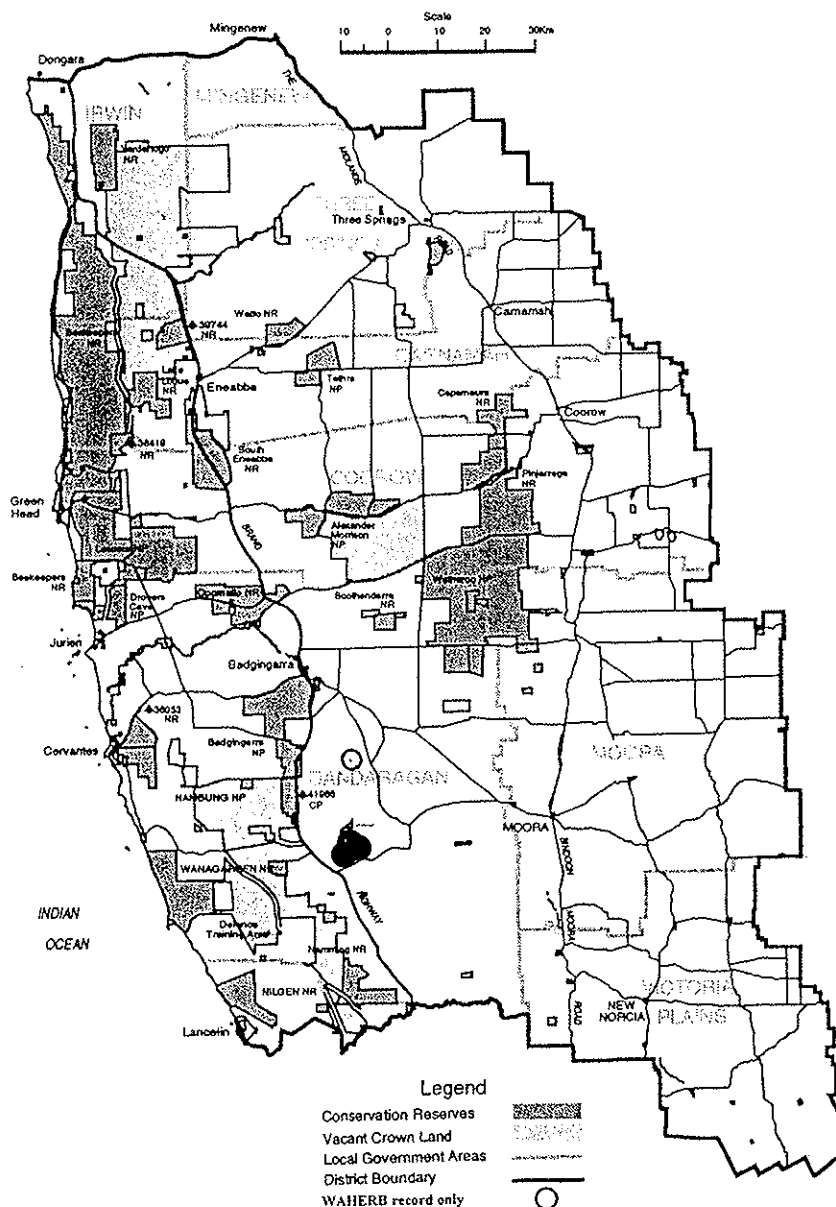
- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that road verge populations are marked.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### Research Requirements

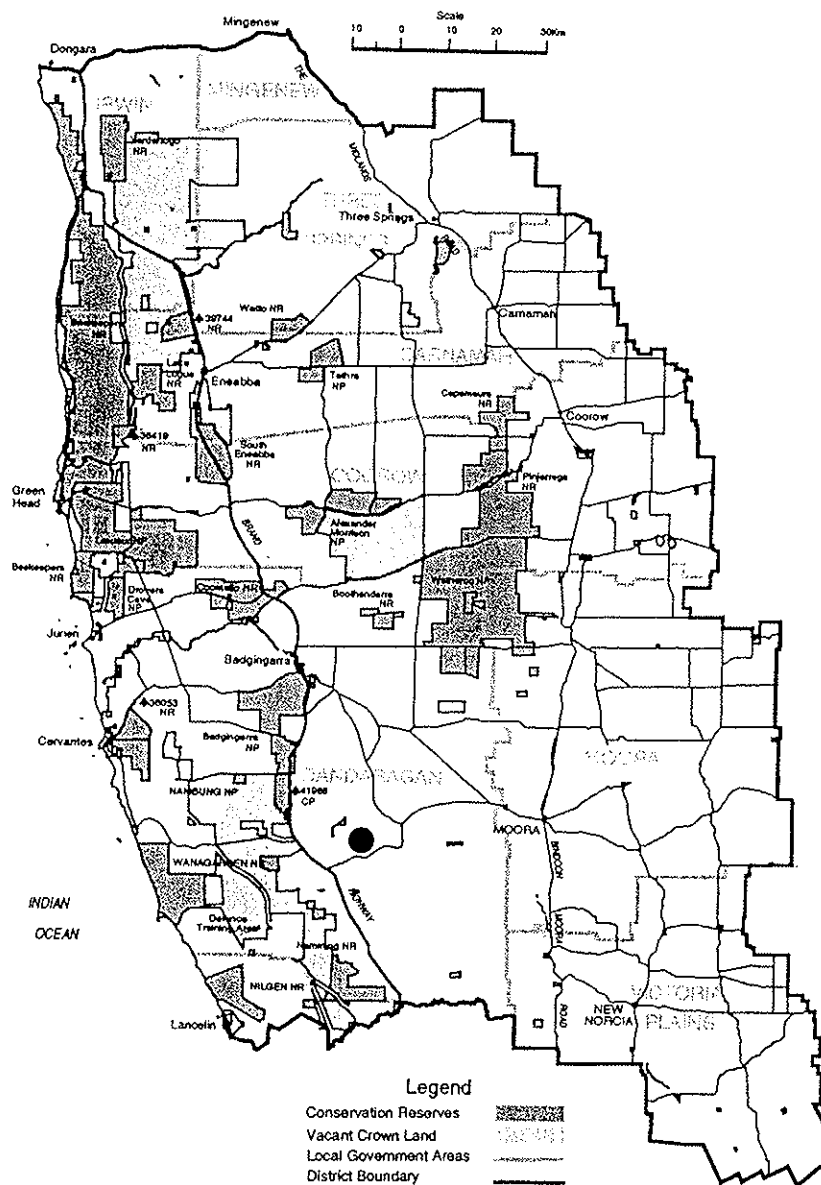
- Further survey is required to assess the conservation status of this form.

### References

Olde and Marriott (1993, 1995).



● *Grevillea synapheae* subsp. *pachyphylla* Minyolo variant  
(S.Patrick & A.P.Brown SP 1139)



● *Grevillea synapheae* subsp. *synapheae* Mt Misery variant (S.D.Hopper 6333)

***Grevillea synapheae* R.Br. subsp. *synapheae* Mt Misery variant (S.D.Hopper 6333)**      PROTEACEAE

This taxon was originally placed on the Priority Flora List as *Grevillea* sp. (Mt Misery) S.D.Hopper 6333 aff. *bipinnatifida*.

It is a sprawling to prostrate shrub to 50 cm tall and 1 m across. The leaves have a flexuose axis with narrow almost pinnatisect primary lobes and pinnatifid secondary lobes. The lobes are spreading or directed backwards. The flowers are in short, erect, pedunculate inflorescences and are cream in colour.

This taxon has been separated by Olde and Marriott as the Mt Misery form of *G. synapheae* subsp. *synapheae* but some specimens closely approach the normal leaf type, so that no formal separation was made until further sampling had been conducted. They also noted an affinity to *G. flexuosa* in the flexuous leaf rachis and spreading to backwardly directed leaf lobes, but the Mt Misery form differs in the fewer leaf lobes and smaller fruits.

**Flowering Period:** September

**Distribution and Habitat in the Moora District**

Known from one population in the Dandaragan area.

Occurs at the top of a breakaway, on brown loam with lateritic gravel and massive laterite in low heath.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. W of Dandaragan	D	Private	25.9.1991	10+	Undisturbed

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at population.
- Maintain liaison with landowner.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

**Research Requirements**

- Further survey is required.

**References**

Olde and Marriott (1993).

Originally described as *Hakea erinacea* Meisn. var. *longiflora* by Bentham in 1870, this was raised to species status by R.M. Barker in 1990. It closely resembles *H. erinacea* and the two species overlap in distribution.

*H. longiflora* is an erect shrub to 80 cm tall. The young branches and leaves are hairy, the hairs longer and more sparse than those of *H. erinacea* and are mixed with shorter hairs. The leaves are terete, divided into three lobes. The lower leaf surface is not grooved as in *H. erinacea*. The perianth of the flowers is 6.5-12 mm long rather than 6-9 mm in *H. erinacea*, and is yellow in colour, the style is also longer, 12-14 mm long, rather than 6-9 mm, and is red in colour. The pollen presenter is particularly long, 3.5-4.5 mm rather than 1.6-2.5 mm. The fruit is a narrow, curved follicle with a long beak. The distal ridge of the seed wing extends only a quarter of the distance to the apex, rather than to the apex as in *H. erinacea*.

**Flowering Period:** June-September

#### Distribution and Habitat in the Moora District

This species is endemic to the Moora District, occurring from the Lesueur area and east of this, south to Cataby.

Grows in low heath or scrub, in brown loam or white sand over laterite, on the upper or lower slopes of breakaways.

Although known from only a few populations this species is apparently more common within its range, as several unvouchered populations have been recorded in the Dandaragan to Badgingarra area (E. Griffin, personal communication).

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Yandan	D	Nature Reserve	30.7.1991	1+	Good
2. Coomallo	D	Nature Reserve	2.7.1992	30 est.	Undisturbed
3. Tootbardie	C	Private	7.1992	10	Good
4.* W of Mt Lesueur	D	National Park	24.7.1980	-	-
5.* E side Mt Lesueur	D	National Park	7.1963	-	-
6.* E of Mt Peron	D	National Park	25.7.1980	-	-
7.* NW of Mt Lesueur	D	National Park	24.7.1980	-	-
8.* NW of Dandaragan	D	Private	1991	-	-
9.* SW of Dandaragan	D	Private	1991	-	-
10.* Badgingarra	D	Private	1991	-	-

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

#### Management Requirements

– Ensure that dieback hygiene procedures are carried out at all populations.

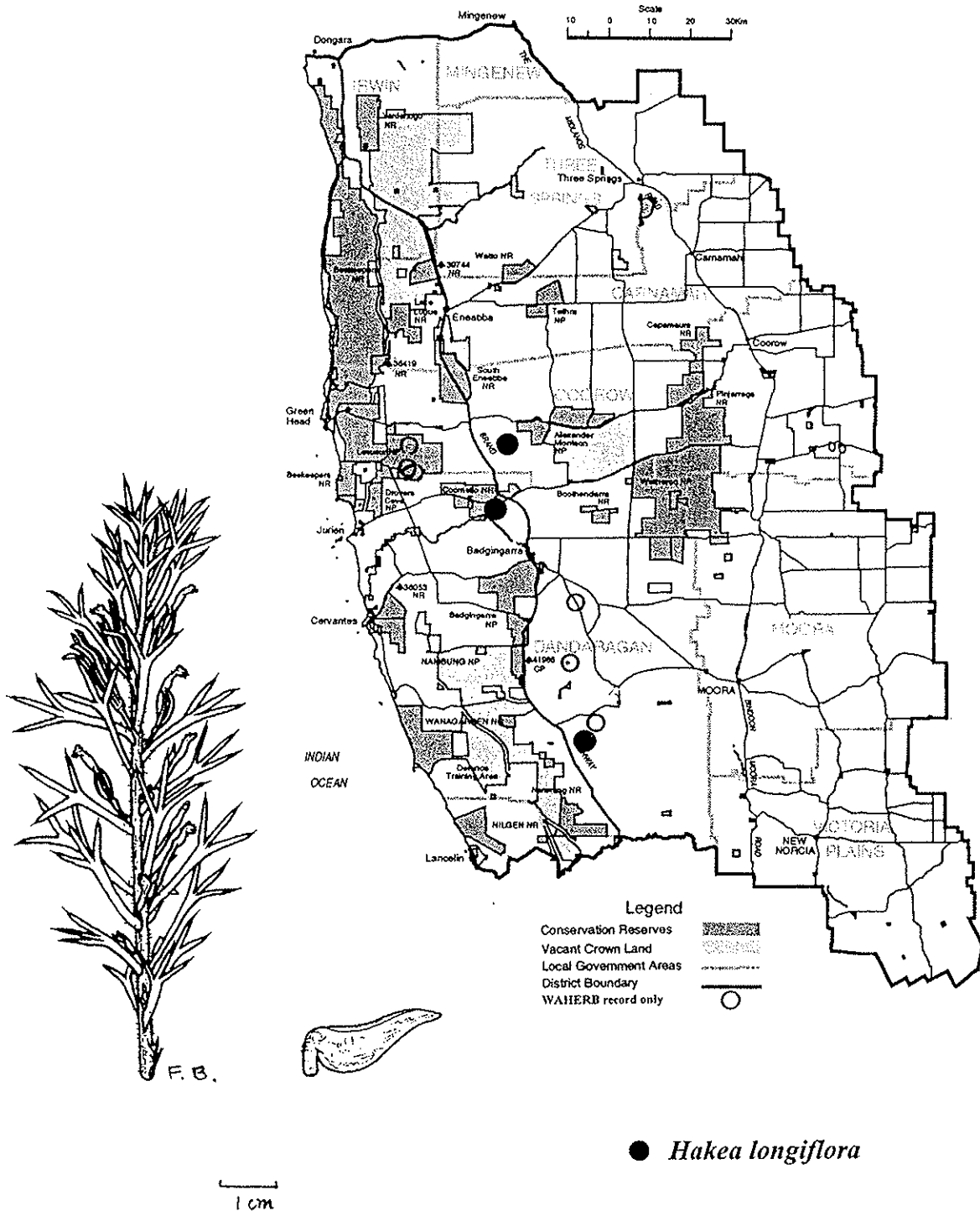


## Research Requirements

- Further survey is required throughout the range of the species, particularly to refind all populations not fully surveyed, and to collect voucher specimens for populations 8-10.

## References

Barker (1990), Bentham (1870).



A small, sometimes recumbent shrub to 90 cm tall. The branches are woolly-hairy, the young shoots silky-hairy, the older leaves becoming glabrous. The leaves are opposite, sessile, folded together and recurved, oblong to ovate-lanceolate in shape, ca. 1-1.5 cm long. The flowers are small, clustered in the axils of the leaves. The calyx is silky-hairy with five acute teeth, nearly equal and as long as the tube. The perianth is tubular and two-lipped, bluish-purple in colour. There are four stamens, the anthers of the lower pair have the lower end of the connective tapering, and terminating in an imperfect anther cell.

**Flowering Period:** September-October

#### **Distribution and Habitat in the Moora District**

This species is endemic to the Moora District, occurring in the Watheroo, Dandaragan to Moora area.

Grows in brown loam and gravel slopes of breakaways, or on grey or yellow sand on upper slopes or uplands, in low heath, or low open woodland with heath. Associated species include *Eucalyptus calophylla*, *E. todtiana*, *Banksia prionotes*, *B. leptophylla* and *Adenanthos cygnorum*.

#### **Conservation Status**

Current: Priority 2

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.*NW of Moora	D	Private	13.9.1988	-	-
2.*SW of Moora	D	Private	2.10.1988	-	-
3.*Watheroo	D	National Park	4.10.1971	-	-
4.*N of Dandaragan	D	-	28.9.1957	-	-
5.*N of Moora	-	-	10.9.1971	-	-

#### **Response to Disturbance**

Unknown

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

Unknown

#### **Management Requirements**

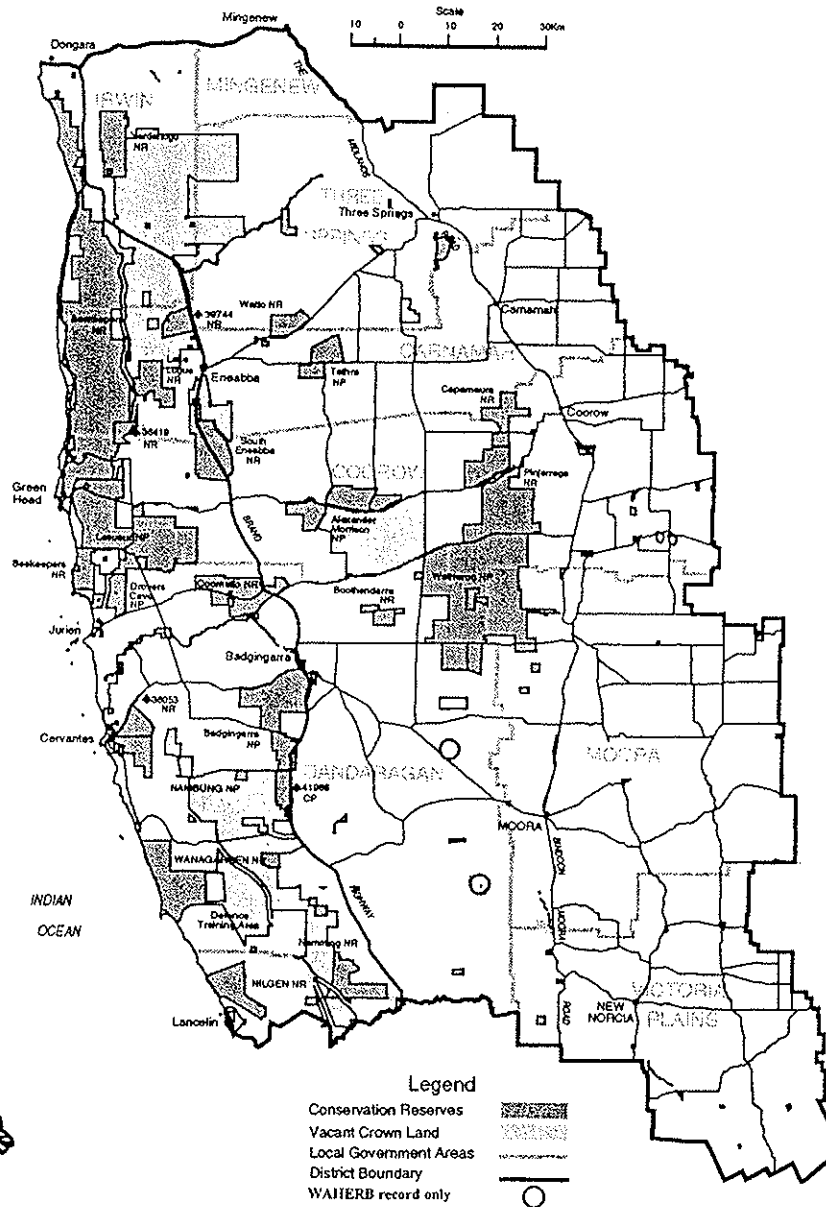
- Ensure that dieback hygiene procedures are carried out at all populations.

#### **Research Requirements**

- Further survey is required.

#### **References**

Bentham (1870), Blackall and Grieve (1981), B. Rye (personal communication).



1cm

*Hemigenia curvifolia*

This species was named in honour of G.L.S. Stone who was the first to collect it.

The plant is tufted, up to 15 cm tall and stilted, without rhizomes and with fibrous roots. The leaves are circular in cross-section, 5-10 cm long and 1-1.5 mm in diameter. The flower head has a stout stalk, and is shorter than the leaves. The outer bracts of the flower head are hard and dark brown in colour. The bracteoles are finely divided and woolly, to 7 mm long, pale yellow in colour, giving the flower head a woolly appearance. The flowers are pale cream in colour, 3-4 mm long, with six perianth lobes joined to form a tube.

*Hensmania stoniella* is similar to *H. turbinata* which differs in its longer, stouter leaves, smaller inflorescence with a shorter stalk and soft, pale fawn outer bracts. *H. turbinata* also lacks stilt roots.

A specimen collected from south-west of Coorow at the eastern edge of the species' range, approaches *H. stoniella* but has pale fawn involucre bracts.

**Flowering Period:** September-November

#### Distribution and Habitat in the Moora District

Recently found populations occur in the Hill River to Watheroo area with earlier records from the Eneabba area in the north and also south to the Nambung area.

Grows in low heath and low banksia woodland in grey, pale yellow or white sand, low lying black peaty sand over clay or laterite. Associated species include *Banksia attenuata* and *B. burdettii*.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* Mumbinea Road	D	-	10.11.1979	-	Not refound in 1991
2.* S of Eneabba	Ca	-	27.4.1977	-	Not refound in 1992
3. Willcocks Road	Co	Private, Shire Road Verge	17.8.1993	30+	Many plants on firebreak
4. Pinjarrega	Co	Nature Reserve, Shire Road Verge	23.10.1992	200+	Healthy, plants mainly on firebreak
5. S of Cockleshell Gully	D	National Park, Shire Road Verge	10.12.1992	10 est.	Partly disturbed
6. Brand Highway N of Banovich Road	Co	MRWA Road Verge	6.11.1992	6	Partly disturbed
7. E of Jurien	D	National Park	20.8.1993		Plants on firebreak
8.* SSE of Eneabba	Co	Nature Reserve	12.11.1981	Occasional-WH	-
9.* Badgingarra	D	National Park	6.10.1981	Occasional-WH	-
10.* Coalara Road	D	Shire Road Verge	18.11.1988	-	-
11.* SW of Coorow	Co	-	1.1975	-	-
12.* Warradarge	Co	-	24.1.1979	Common-WH	-

#### Response to Disturbance

Appears to be favoured by soil disturbance on firebreaks, with regeneration of many more plants than in adjacent undisturbed areas.

## Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

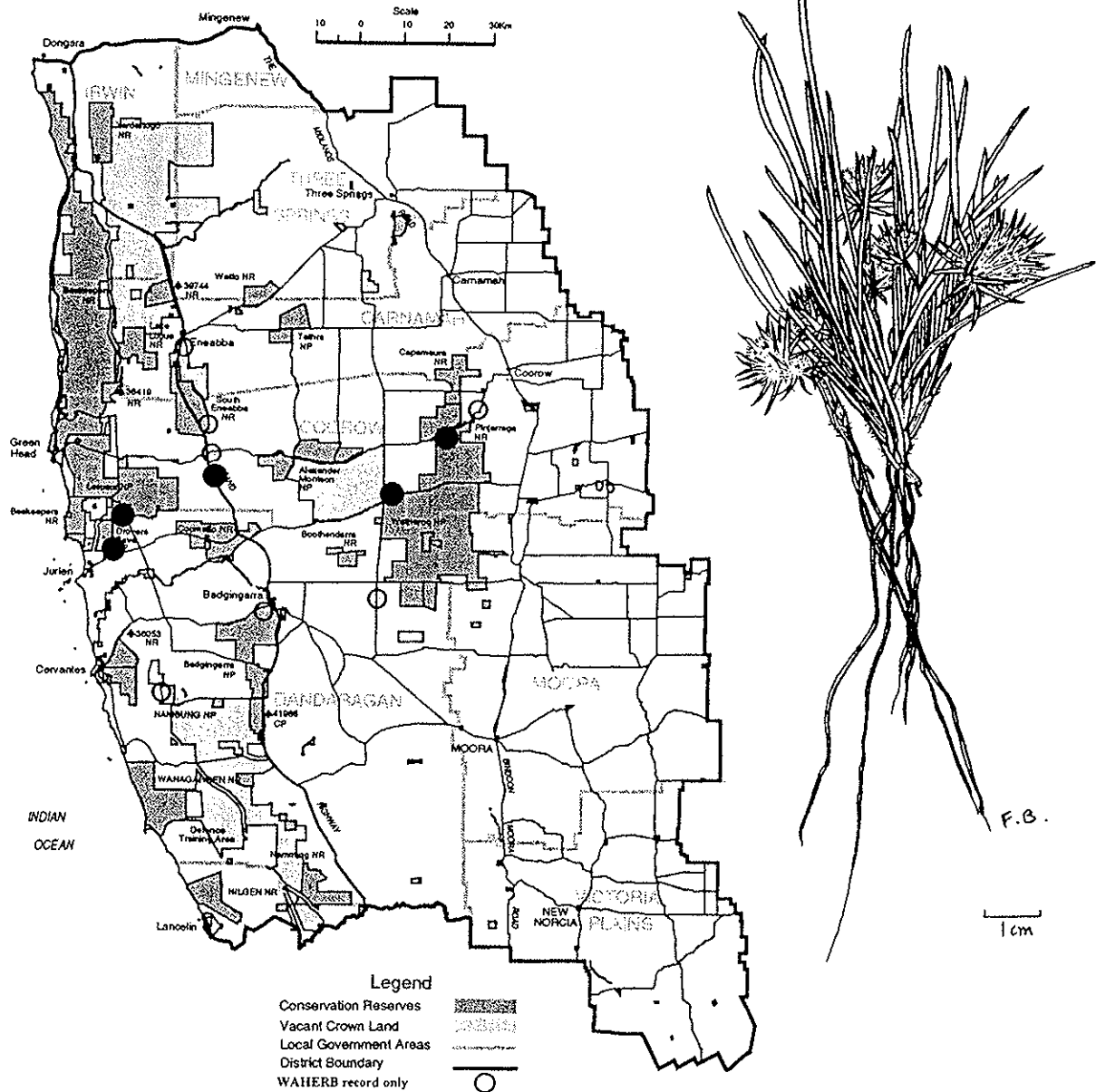
- Ensure that road verge populations are marked.
- Ensure that dieback hygiene procedures are carried out at all populations.

### Research Requirements

- Research is required to determine length of intervals between disturbance on firebreaks, best suited to the requirements of the species. Research is also required into the fire response of the species.

### References

Keighery (1987).



● *Hensmania stoniella*

*Hypocalymma serrulatum* ms is an erect shrub, single-stemmed at the base and up to 1.7 m tall. The leaves are linear and opposite, 5-10 mm long, held appressed to the stem and recurved above. They have minutely serrulate edges. The flowers are white or white to pink and are arranged on short stalks in few-flowered clusters in the axils of the upper leaves. The filaments of the stamens bend inwards so that the anthers are grouped around the style. The fruit are up to 5 mm in diameter with three raised ridges on the top.

This species is related to *H. angustifolium* but differs in the anther arrangement and the shorter, appressed leaves.

**Flowering Period:** October, January, April-May

**Fruiting Period:** August-September

#### **Distribution and Habitat in the Moora District**

Known from five populations over a range of 30 km to the west of Badgingarra to Dandaragan. There are two earlier records from an area ca. 40 km further south, to the north of Regans Ford.

Grows in grey sand over clay in banksia heath or low banksia woodland, usually in drainage lines or low damp areas.

#### **Conservation Status**

Current: Priority 2

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Cooljarloo	D	Conservation Park	14.9.1993	10+	Healthy
2. Bibby Road	D	National Park, Shire Road Verge	18.9.1993	50+	Healthy
3. S of Badgingarra	D	National Park	9.1.1992	50+	Disturbed
4. W of Badgingarra	D	National Park	8.10.1991	50+	Undisturbed
5. Wongonderra	D	VCL	15.5.1994	1000+	Healthy
6.* N of Regans Ford	D	-	14.5.1967	-	-

#### **Response to Disturbance**

Unknown

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

Presumed susceptible

#### **Management Requirements**

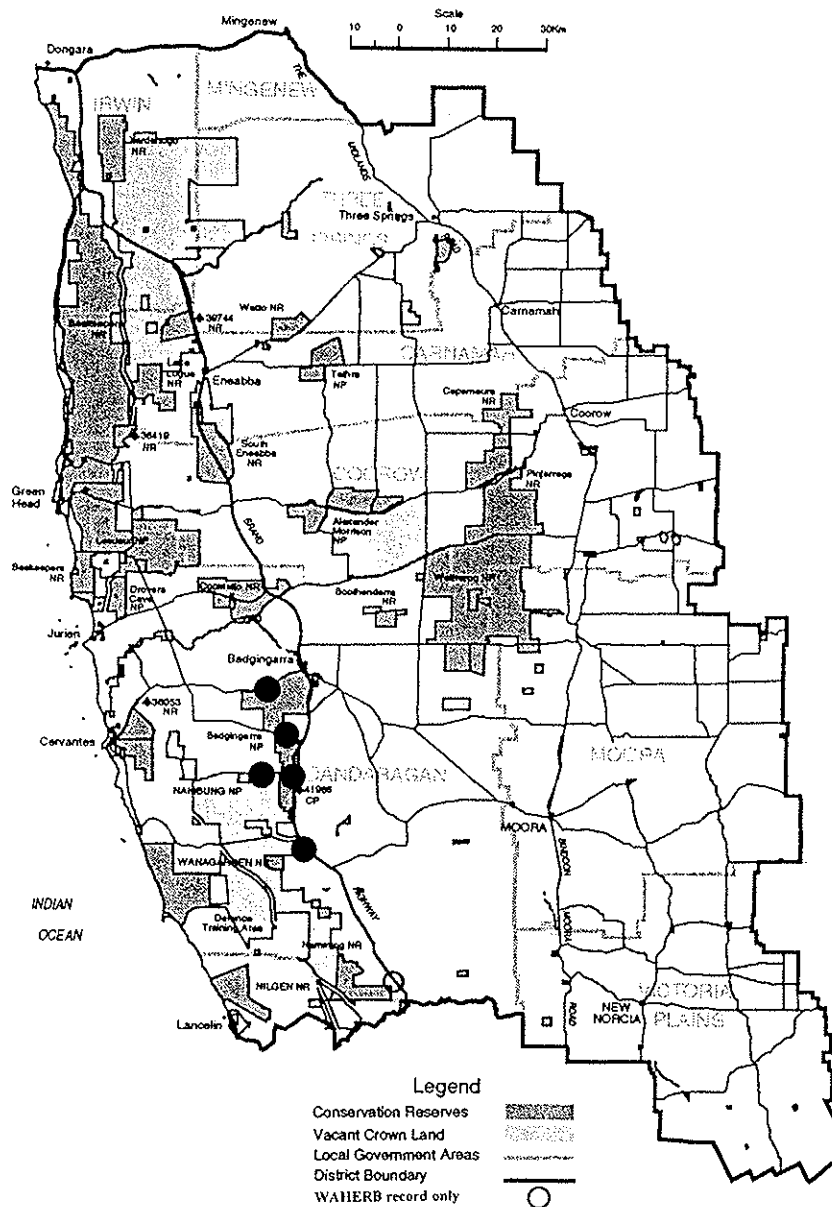
- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that road verge populations are marked.

## Research Requirements

- Further survey is required, particularly in along drainage lines in conservation areas between Catby and Regans Ford.

## References

G. Keighery (personal communication).



● *Hypocalymma serratulum ms*

## *Hypocalymma tetrapterum* Turcz.

MYRTACEAE

This species was described in 1862 by Turczaninow from material collected by James Drummond from between the Moore and Murchison Rivers.

It is a spreading, open shrub 0.5 m to 1 m in height, with the branches four-angled. The leaves are broad, oblong and obtuse, to 15 mm long and 5 mm wide. The flowers are white, sessile in pairs in the axils of the opposite leaves. The ovary is three-celled, with one ovary in each cell.

**Flowering Period:** June-September

### **Distribution and Habitat in the Moora District**

This species is known over a narrow range of ca. 35 km between Cataby and Badgingarra. Several earlier records appear to have been made from within its present known range.

It occurs along creeklines in wandoo or mixed marri/jarra/wandoo woodland in heath or scrub, where it grows in yellow sandy loam or grey sand over clay. Also grows on higher ground in open wandoo woodland on brown loam and laterite and in lateritic gravel on breakaways in low heath.

### **Conservation Status**

Current: Priority 2

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Minyulo	D	Nature Reserve	26.9.1991	50+	Undisturbed but some weed infestation
2. Minyulo	D	Nature Reserve	26.9.1991	20+	Undisturbed
3. Yandan	D	Nature Reserve	30.7.1991	10+	Firebreak runs through population
4. Cataby	D	MRWA Road Verge	18.8.1991	50+	Partly disturbed
5. Duneam Road	D	Shire Road Verge	13.8.1991	100+	Undisturbed
6. Cataby	D	MRWA Road Verge	30.7.1991	50+	Disturbed and some weed infestation
7.* E of Cataby	D	Private	15.9.1988	-	-
8.* 6 miles N from Dandaragan	-	-	24.8.1948	-	-

### **Response to Disturbance**

Unknown

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

Presumed susceptible

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that road verge populations are marked.

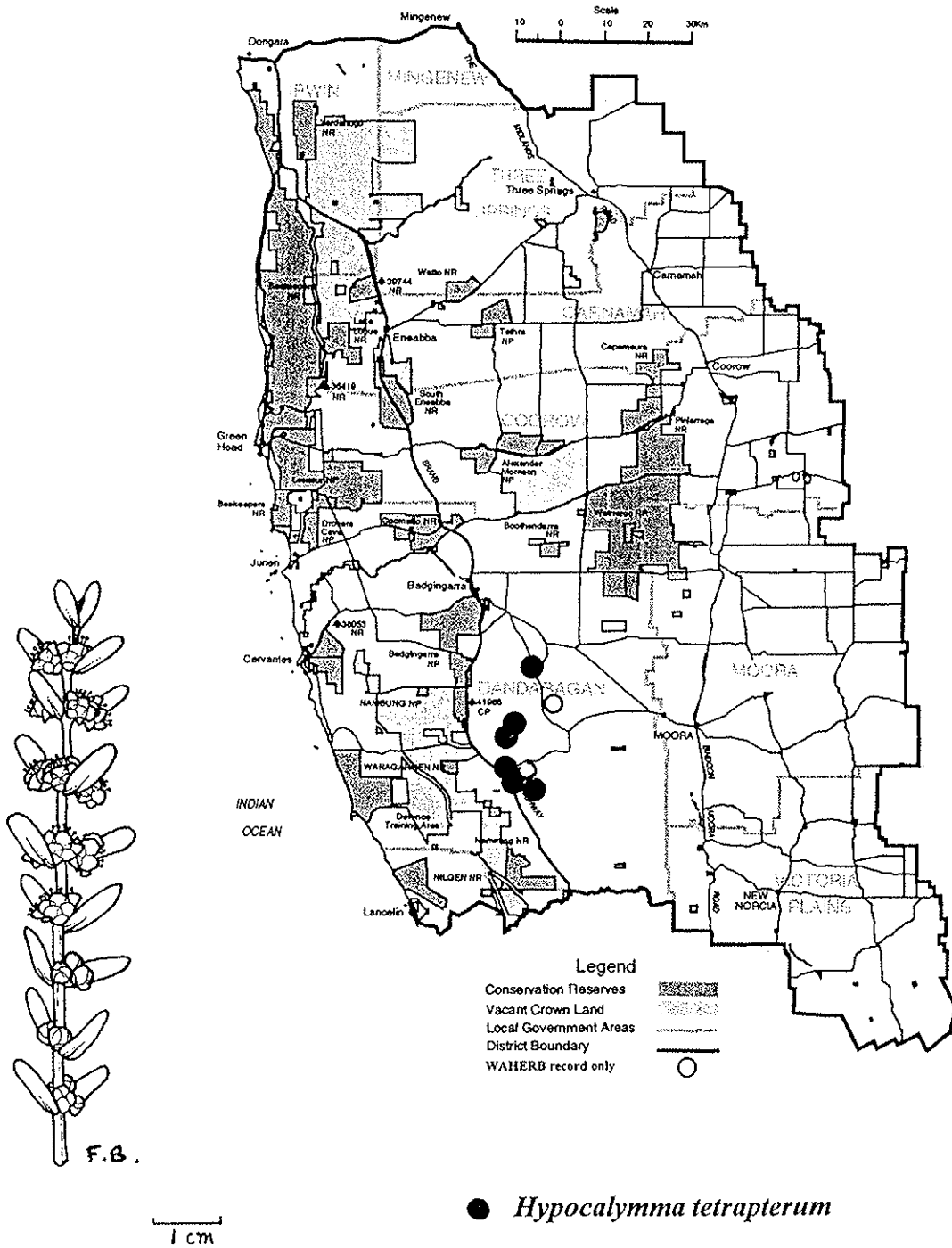


**Research Requirements**

- Further survey is required.

**References**

Bentham (1866), Blackall and Grieve (1980), Turczaninow (1862).



● *Hypocalymma tetrapterum*

*Hypocalymma xanthopetalum* F.Muell. var. *linearifolium*  
C.A.Gardner ex Strid & Keighery ms

MYRTACEAE

A diffuse, low shrub to 0.3 m tall with pubescent branches. The yellow flowers are sessile and grouped in pairs. The leaves are opposite, to 1.5 cm long and 0.5 to 1 mm wide, linear in shape with a pointed apex. The ovary is three-celled, the style continuous with the three ridges on the surface of the ovary, without a depression.

This variety has leaves which are much narrower than those of *Hypocalymma xanthopetalum*. The latter has obovate to oblong leaves with an obtuse apex. This is probably the species *H. ciliatum* Turcz. included by Bentham in *H. xanthopetalum* as a slight variety with narrower leaves.

**Flowering Period:** July-August, October

**Distribution and Habitat in the Moora District**

Has been recorded over a range of ca. 35 km from Eneabba to the Lesueur area, with three recent records throughout that range.

Grows in white or grey sand over laterite in low or open heath sometimes with low banksia scrub.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Lake Logue	Ca	Nature Reserve	11.7.1991	10+	Undisturbed
2.* N of Diamond of the Desert Spring	D	-	26.8.1948	-	-
3.* E of Mt Peron	D	-	31.1.1965	-	-
4.* W and S of Mt Lesueur	D	-	9.10.1985	-	-
5.* S of Eneabba	Ca	-	10.7.1977	-	-
6.* Cockleshell Gully	-	-	25.8.1938	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

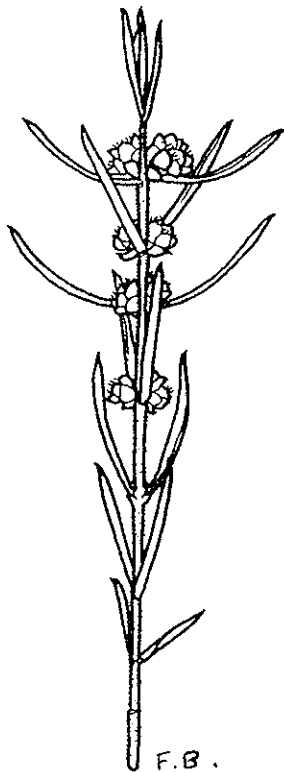
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

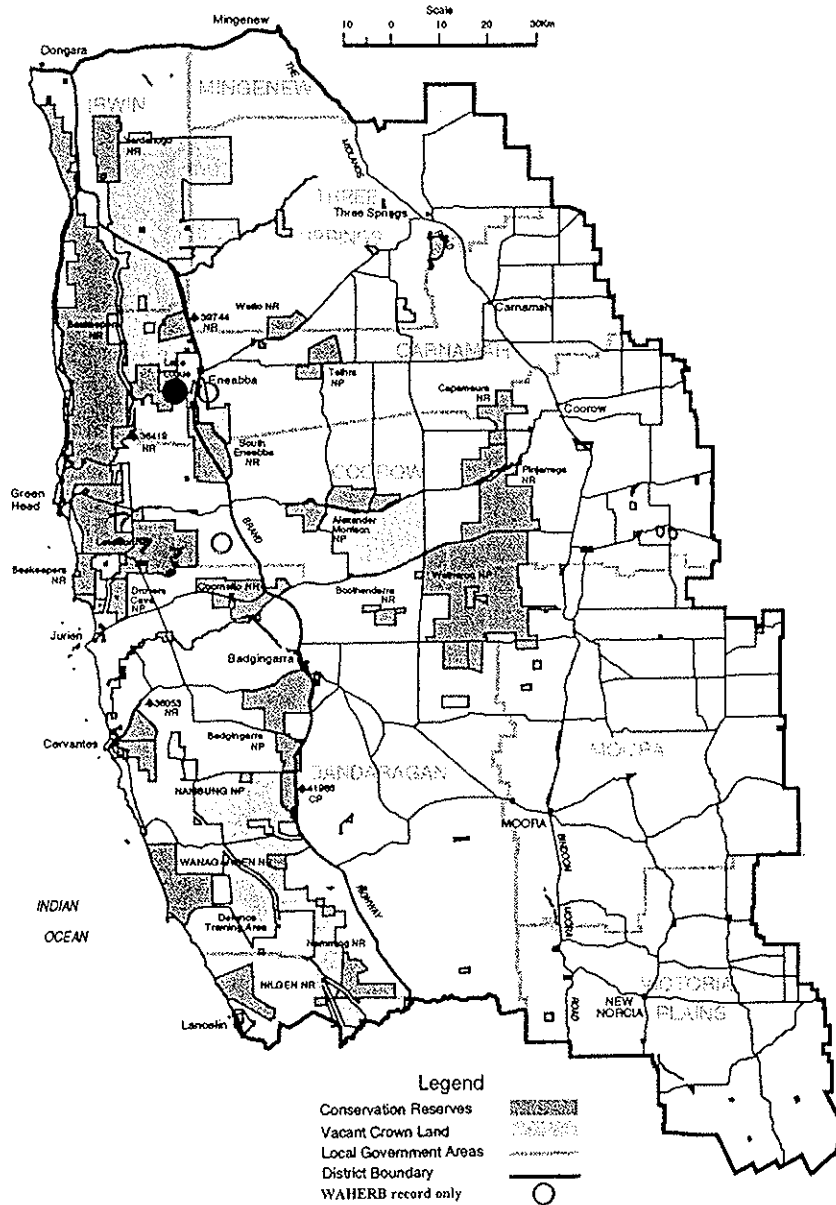
- Further survey is required.

**References**

Bentham (1866).



1 cm



● *Hypocalymma xanthopetalum* var. *linearifolium* ms

## *Hypocalymma* sp. Cataby (G.J.Keighery 5151)

MYRTACEAE

An open, spreading shrub to 1 m tall and 1 m in diameter. The leaves are opposite and spreading, 1 to 1.8 mm long and varying from 1 to 2.5 mm wide, linear to elliptic in shape with an acute point. The flowers are white, with short stalks or stalkless, in few-flowered clusters at the base of the leaves.

This taxon is probably a hybrid between *Hypocalymma tetrapterum* Turcz. and *H. angustifolium* (Endl.) Schauer. See determination by Arne Strid 1990 on the specimen "North of Perth between Moora and Jurien Bay" Thomas G. Hartley no. 13930.

**Flowering Period:** August

### **Distribution and Habitat in the Moora District**

This taxon has been collected recently from one locality where it occurs with *H. tetrapterum* and shows a range of leaf width and length. One collection made in 1973 from between Moora and Jurien Bay is possibly from another locality.

Grows in open low woodland of marri, wandoo and jarrah where it occurs on grey sand over clay, in open scrub with *Jacksonia sternbergiana*, *Hakea prostrata* and *Macrozamia riedlei*.

### **Conservation Status**

Current: Priority 2

### **Populations Known in the Moora District**

---

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Cataby Brook	D	MRWA Road Verge	1.8.1991	5+	Area disturbed and weed infested

---

### **Response to Disturbance**

Unknown

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

Presumed susceptible

### **Management Requirements**

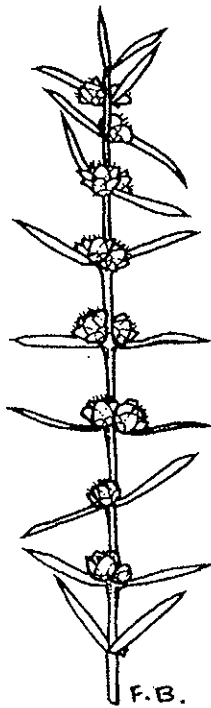
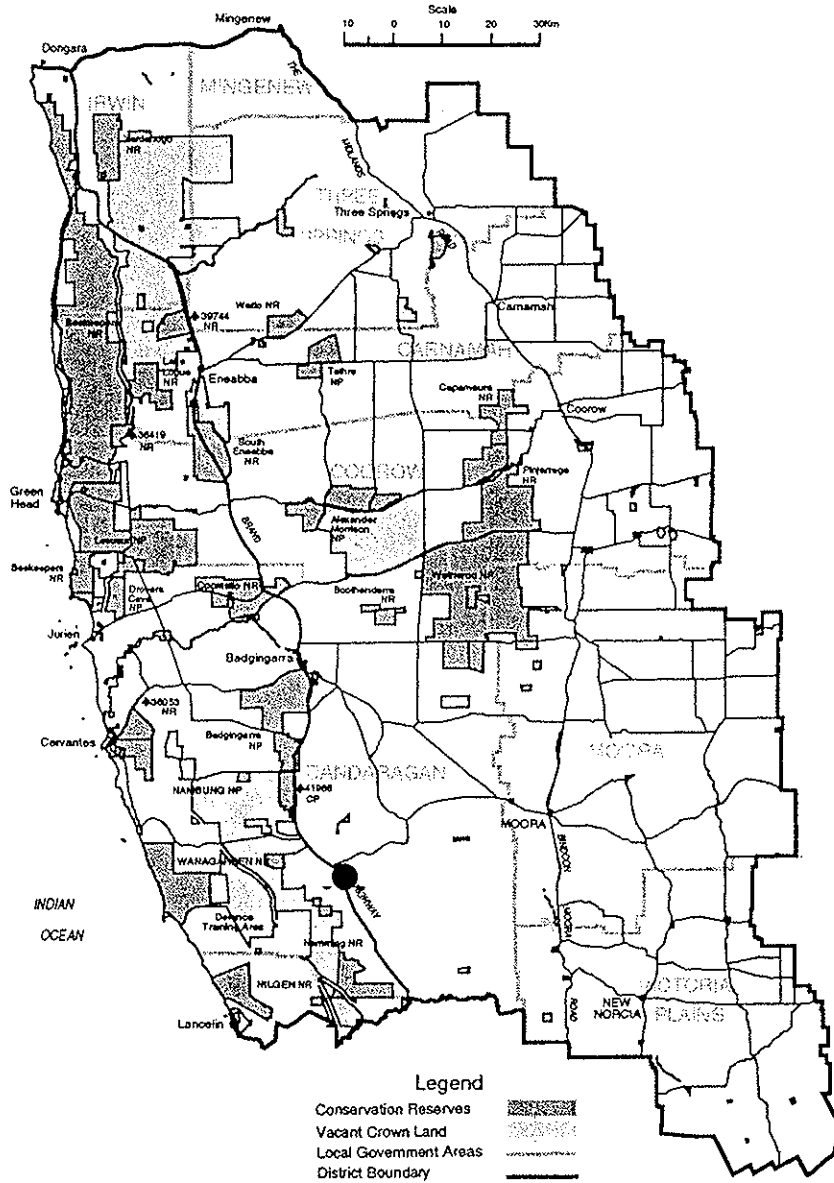
- Ensure that dieback hygiene procedures are carried out at population.

### **Research Requirements**

- Further survey is required.
- Taxonomic study is required to clarify the status of this taxon.

### **References**

G. Keighery (personal communication).



● *Hypocalymma* sp. Cataby (G.J.Keighery 5151)



*Lasiopetalum* sp. Coorow (E.Ried 101)

## STERCULIACEAE

An erect shrub to 1.5 m tall. The leaves are alternate, entire, ovate to slightly hastate in shape, with flat margins, to ca. 4 cm long and ca. 2.5 cm wide. They are hairless above, with dense stellate hairs on the lower surface, which tend to be rusty in colour on the margins and midvein. The flowers are in dense racemes to 4 cm long, in groups of up to four at the end of long pedicels to ca. 3 cm long. The bracteoles are terete and filiform, longer than the calyx. The flowers are ca. 5-8 mm in diameter with the calyx divided into five lobes. The outside of the calyx is densely covered with whitish stellate hairs. The inner surface has some short white hairs but is pinkish-purple in colour. The petals are very small, ca. 1 mm long and are densely stellate tomentose. The style is glabrous.

This species is related to *Lasiopetalum oldfieldii* which occurs in the Geraldton District and differs in the leaves which are ovate, with recurved margins, and in the bracteoles, which are shorter than the calyx.

**Flowering Period:** August-November, April

**Distribution and Habitat in the Moora District**

Occurs from north of Eneabba east towards Winchester and south to the west of Watheroo National Park. The earliest collection was made from Coorow in 1960 but no populations were found during this survey in that area or so far east.

Grows in grey sandy clay or yellow or white sand in low heath under open low woodland of *Eucalyptus tottiana* or mallees, low open banksia woodland or shrubland on flat plains or gentle slopes.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Turkey Flat Road	Ca	Shire Road Verge	4.10.1990	30 est.	Partly disturbed
2a. Brand Mudge Road	Ca	Shire Road Verge	26.9.1990	20 est.	-
2b. Brand Mudge Road	Ca	Shire Road Verge	4.10.1990	40 est.	Undisturbed
3a. Carnamah-Eneabba Road	Ca	MRWA Road Verge	15.11.1990	100+	Undisturbed
3b. Brand Mudge Road	Ca	Shire Road Verge	15.11.1990	50+	-
4. Junction of Coalara Road	D	Shire Road Verge	8.10.1991	5	Some regrowth of plants damaged by grading
5. Big Soak Plain	Co	VCL	8.11.1991	30+	Disturbed by <i>Cannabis</i> plantation
6. S of Skipper Road	I	MRWA Road Verge	30.4.1992	2	Undisturbed
7. Beekeepers Road	Ca	MRWA Road Verge	30.4.1992	2	Undisturbed
8. S of Beekeepers Road	Ca	Nature Reserve	30.4.1992	1	Undisturbed
9. Marchagee Track	Co/D	Shire Road Verge	29.4.1992	50 est.	Undisturbed
10. Coalara Road	Co/D	National Park, Shire Road Verge	20.11.1992	10+	Undisturbed
11. Coalara Road	Co	National Park	19.11.1992	10+	Undisturbed
12. Marchagee Track	Co/D	National Park	8.11.1991	10	Partly disturbed at edge of graded road
13. N of Beekeepers Road	Ca	VCL	1.9.1993	20+	Undisturbed
14. S of Yarra Yarra Lake	Ca	Shire Road Verge	17.8.1993	4	Healthy
15. Beekeepers Road	Ca	VCL	19.8.1993	10+	Undisturbed
16. N of Beekeepers Road	Ca	MRWA Road Verge	5.11.1992	3	Partly disturbed

Populations Known in the Moora District (Cont'd)

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
17.* N of Eneabba	-	-	14.8.1976	-	-
18.* Coorow	-	-	1960	-	-

Response to Disturbance

The plants resprout from rootstock after mechanical damage.

Susceptibility to *Phytophthora* Dieback

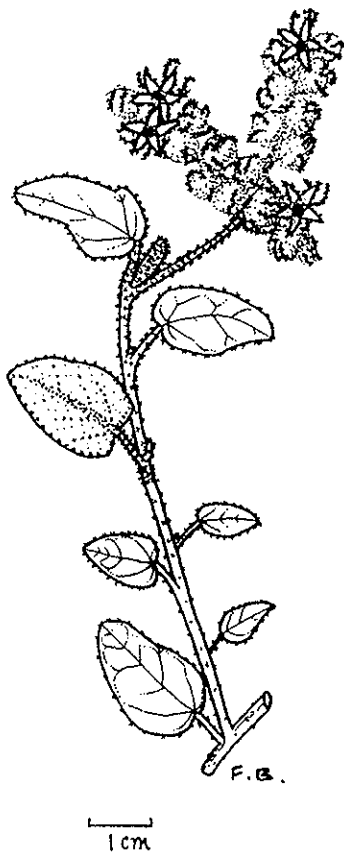
Unknown, but thought to be high.

Management Requirements

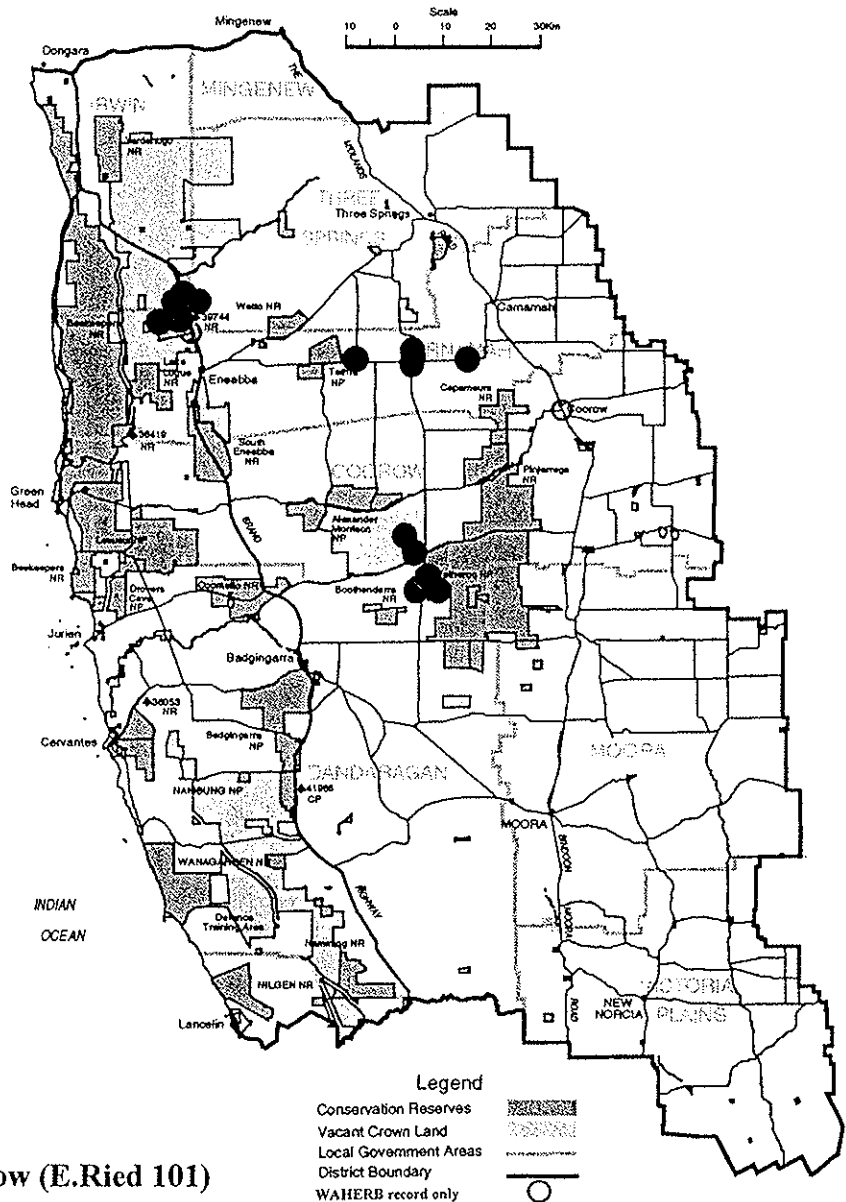
- Ensure that dieback hygiene procedures are carried out at all populations.

References

Paust (ca. 1973).



● *Lasiopetalum* sp. Coorow (E.Ried 101)



## *Leucopogon glaucifolius* W.Fitzg.

## EPACRIDACEAE

An erect or spreading low shrub to 30 cm with finely-hairy branches and alternate, erect leaves to 13 mm long and 2 mm wide. They are glabrous, narrow-oblong in shape, with sharp pointed tips and rolled back margins. The flowers are distributed along the branches in 1-3 flowered spikes in the axils of the leaves and are held erect. The bracts and bracteoles are pale, with a prominent mucro. The sepals are narrow, pointed and glabrous, with shortly-hairy margins. The calyx is longer than the corolla tube. The corolla is white, up to 5 mm long, the tube and lobes equal in length. The lobes are revolute, bearded inside and pointed. The anthers are without sterile tips. The fruit is globular, flat-topped with five ribs and is ca. 4 mm long.

This species is similar to *Leucopogon brevicuspis* and *L. propinquus* which are both larger shrubs with longer, broader leaves. The fruit of *L. glaucifolius* also differs in the flat-topped shape and the presence of ribs.

**Flowering Period:** November in the Moora District, also October and December further south.

### Distribution and Habitat in the Moora District

This species was first collected in 1902 from Midland Junction and it is now presumed to be extinct in the metropolitan area.

Since then several other collections of the species have been made. Four are from locations to the west and north-west of Dandaragan and one from south of Dongara in the Moora District. There have been further collections of the species from the Stirling Ranges and east of Geraldton.

In the Moora District, *L. glaucifolius* has been recorded occurring in white or grey sand in low woodland of *Banksia menziesii*, *B. attenuata* and *Eucalyptus todtiana* in scrub. The northern population was recorded from low forest of *E. erythrocorys* and low scrub with *Calothamnus quadrifidus*, in brown-orange sand over Tamala limestone.

### Conservation Status

Current: Priority 2

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* Strathmore Road	D	Nature Reserve	5.11.1975	-	-
2.* Woolka Road	D	-	6.11.1988	-	-
3.* Mullering Road	D	Shire Reserve	1.12.1992	-	Long unburnt
4.* Bibby Road	D	National Park	7.12.1992	-	Long unburnt
5.* S of Dongara	I	Nature Reserve	20.11.1992	-	-

### Response to Disturbance

Populations 3 and 4 and the population in the Geraldton District were recorded from areas that had been long unburnt.

### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

### Management Requirements

— Ensure that dieback hygiene procedures are carried out at all populations.

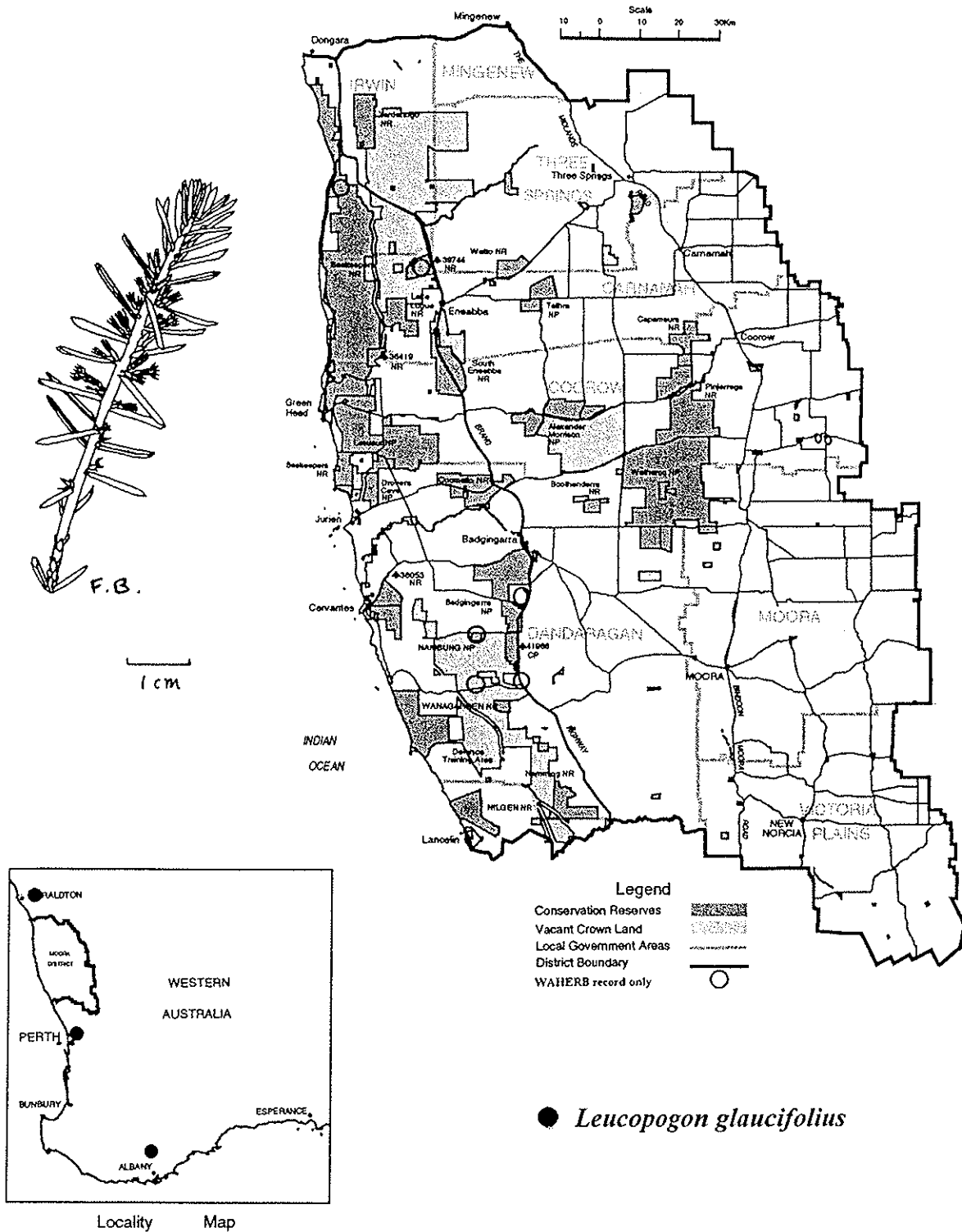


## Research Requirements

- Further survey is required.

## References

Fitzgerald (1903), Kelly *et al.* (1993), Marchant *et al.* (1987).



## *Lysinema elegans* Sond.

## EPACRIDACEAE

*Lysinema elegans* is an erect shrub to 60 cm high with slender, shortly-hairy branches and small leaves. These are oblong to ovate in shape, to 4 mm long, or shorter on side branches. They are held erect and appressed to the stem and are keeled. The flowers form dense terminal heads, the bracts and sepals forming a narrow cylindrical involucre 10-15 mm x 1-2 mm and dark brown in colour around the base of each individual flower. The bracts have glabrous or nearly glabrous margins. The corolla is creamy-white in colour and has a narrow, cylindrical tube up to 16 mm long, with spreading lobes to 6 mm long, which are glabrous inside and out. The anthers are long and narrow, partly exerted from the corolla tube and recurved. The style is also exerted.

**Flowering Period:** October-November

### **Distribution and Habitat in the Moora District**

*L. elegans* has been recorded once in the Moora District when it was collected just north of Regans Ford in 1969. It also occurs further south in the Swan Region where there is a large population in the Moore River National Park and another west of Gingin, 40 km further south. In the metropolitan area it occurs over a range of less than 6 km in the Jandakot-Canning Vale District.

The population at Regans Ford was recorded from a dry sandy depression. No other details of habitat were noted. The populations in the Moore River National Park and at Gingin grow at the edge of damp depressions on grey or white sand. They occur in low woodland of *Banksia attenuata* and *B. menziesii* over scrub. Associated species in the Moore River National Park include *Adenanthos cygnorum*, *B. loricata*, *Verticordia nitens* and *Jacksonia eremodendron*.

The location at Regans Ford has been searched but the population has not been refound. The population in the Moore River National Park is large (1000+ plants over a range of > 4 km). There is also a population at Gingin on private land of ca. 20 plants. In the metropolitan area the species is known from a number of populations with a total of several hundred plants, largely on private land.

Areas of suitable habitat still exist to the north of Regans Ford and south of Gingin where the species may still occur.

### **Conservation Status**

Current: Priority 2

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* N of Regans Ford	D	-	17.10.1969	-	-

### **Response to Disturbance**

Favours open sites and is often found growing on firebreaks or cleared areas.

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

Presumed susceptible

### **Management Requirements**

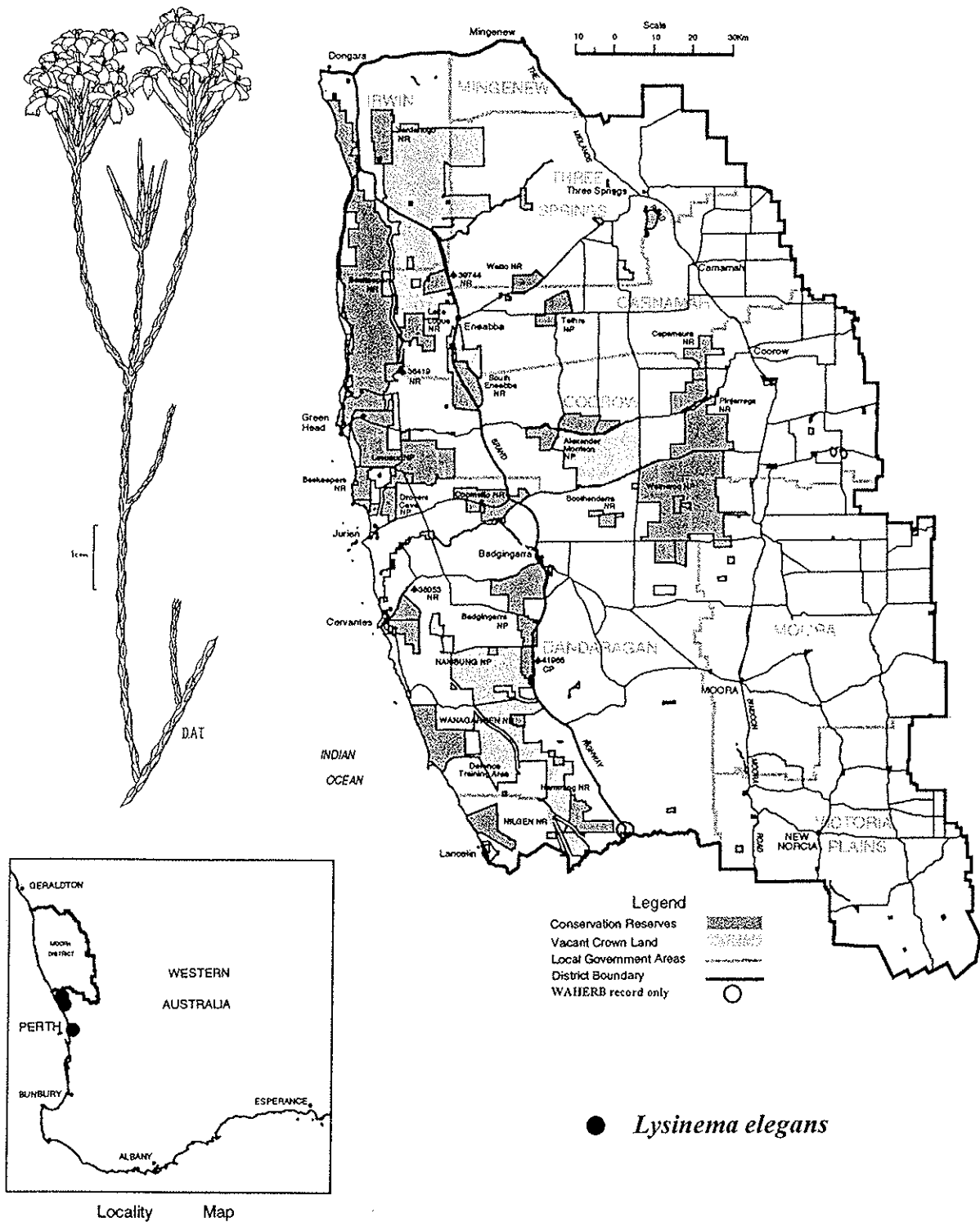
- Ensure that dieback hygiene procedures are carried out at population.

## Research Requirements

- Further survey is required around its known occurrence in the north of the Swan District and south of the Moora District.

## References

Bentham (1869), Kelly *et al.* (1993), Leigh *et al.* (1984), Marchant *et al.* (1987).



A low perennial, herbaceous shrub to 30 cm tall, with erect slender stems forming a dense tuft. The leaves are linear, the lower ones 6-12 x 0.5-1 mm, or reduced to small scales. The flowers are grouped in small cymes of up to 20 in each, situated in the axils of the leaves or branches. Each flower is very small, ca 2 mm long with a short stalk. The calyx is divided to the base into five equal segments, oblong-elliptic in shape, green and white in colour and 2 mm long. The petals are absent. There are eight stamens. Each cell of the three-celled ovary contains one ovule. There are three styles, with small terminal stigmas. The persistent calyx encloses the capsule which splits by three valves to release the seeds.

**Flowering Period:** September-November in the Moora District, February in the metropolitan area.

#### Distribution and Habitat in the Moora District

Three populations of this species have been found recently over 50 km in the central part of the Moora District between Badgingarra, Eneabba and Watheroo. There are also earlier records from near Jurien Bay and just south of Regans Ford. It also occurs at two locations in the metropolitan area. There is a collection from Dryandra State Forest further south which has an affinity to this species.

*Macarthuria apetala* grows in grey sand, in open low banksia woodland and heath, sometimes in areas of disturbance. Associated species include species of *Dryandra*, *Hypocalymma*, *Hakea* and *Conospermum*.

Two populations in the Moora District occur on national parks, and a third, which is known only from a recent anonymous collection, may be from within a nature reserve. The populations in the metropolitan area are on a local government reserve and a nature reserve. The species has been found on a recently burnt area and on a firebreak, indicating that it may be a disturbance opportunist.

Further survey is required within the known range in the Moora District and further south to the metropolitan area. As the species is small and relatively inconspicuous, possibly evident only after disturbance, it may be under recorded.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. W of Badgingarra	D	National Park	8.10.1991	50+	Healthy, plants mainly on firebreak
2.* Cervantes	D	-	11.9.1978	-	-
3.* NW of Watheroo	D	National Park	17.11.1988	-	Occurred after fire
4.* S of Eneabba	Ca	-	11.1991	-	-
5.* S of Jurien Bay	D	-	12.9.1973	-	-

#### Response to Disturbance

Some populations have been found on recently burnt or disturbed soil.

#### Susceptibility to *Phytophthora* Dieback

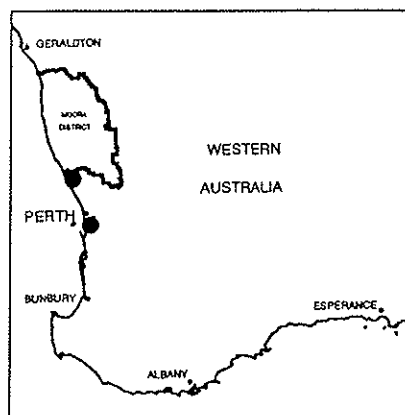
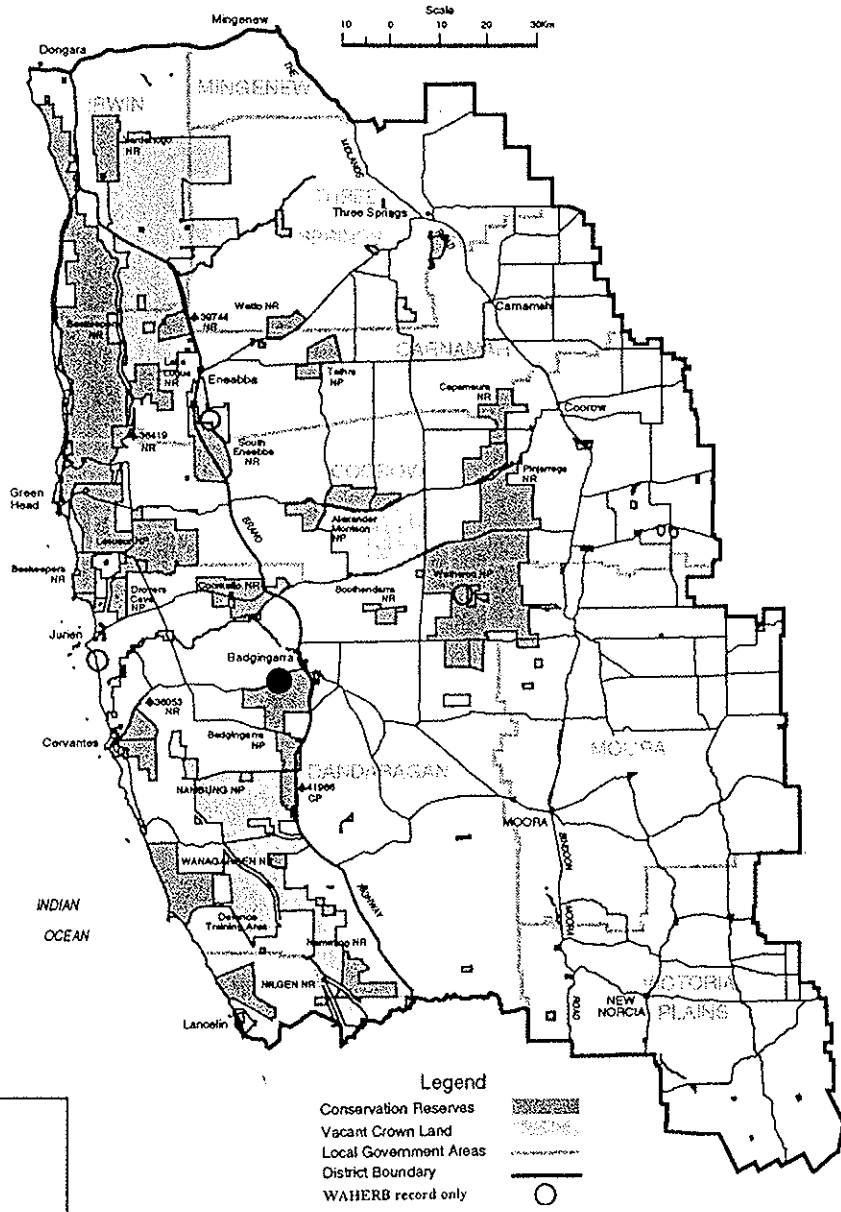
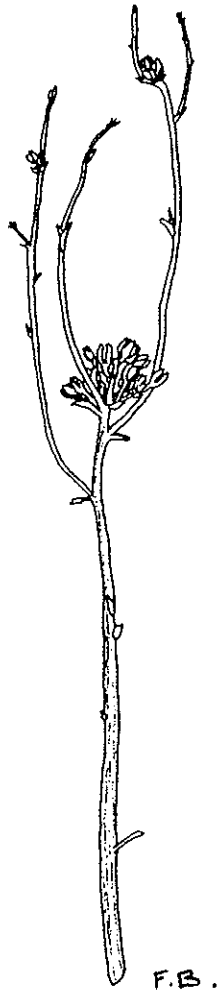
Unknown

## Research Requirements

- Further survey is required, particularly to refind populations 2-5.

## References

Bentham (1878), G. Keighery (personal communication), Marchant *et al.* (1987).



Locality Map

● *Macarthuria apetala*

*Mesomelaena stygia* (R.Br.) Nees  
subsp. *deflexa* (Kuek.) K.L.Wilson

CYPERACEAE

An erect perennial herb to 30 cm tall, forming loose tussocks. The stems are without nodes, pale green in colour, 0.5-0.7 mm in diameter. The leaves have dull sheaths, yellow-brown in colour and the leaf blade is rigid, channelled and pungent, with a membranous ligule. There are two, unequal involucral bracts, the lower much longer than inflorescence, deflexed at ca. 90 degrees to the stem, ca. 40-60 mm long. The inflorescence is subglobular, the glumes arranged in two opposite rows. There are three perianth segments, with broad bases enclosing the nut, and in the upper part abruptly narrowing to long, twisting points. The fruit is a nut, ca. 2.5 mm long.

This taxon differs from *Mesomelaena stygia* subsp. *stygia* in the deflexed involucral bract, more slender stems, shorter nuts and less shiny leaf sheaths.

**Flowering Period:** July-October

**Distribution and Habitat in the Moora District**

No populations were found during this survey in the District. It has been recorded from south of Eneabba and 60 km further to the north-east in an area west of Arrino where it was recorded in 1980. There is an unconfirmed report that this taxon also occurs north-west of this, in the Mt Adams area.

Grows in clay and gravel, grey or white sand over clay or laterite, on breakaways or slopes, in low open heath.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* SSE of Eneabba	Co	-	16.10.1981	Common-WH	-
2.* WNW of Arrino	TS	-	22.7.1980	-	-
3.* S of Eneabba	Ca	VCL (Mining Lease)	25.10.1978	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

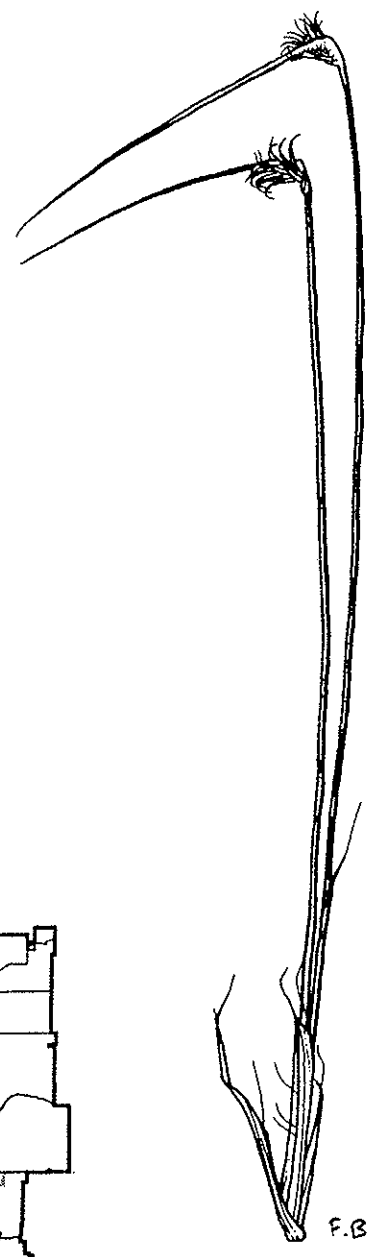
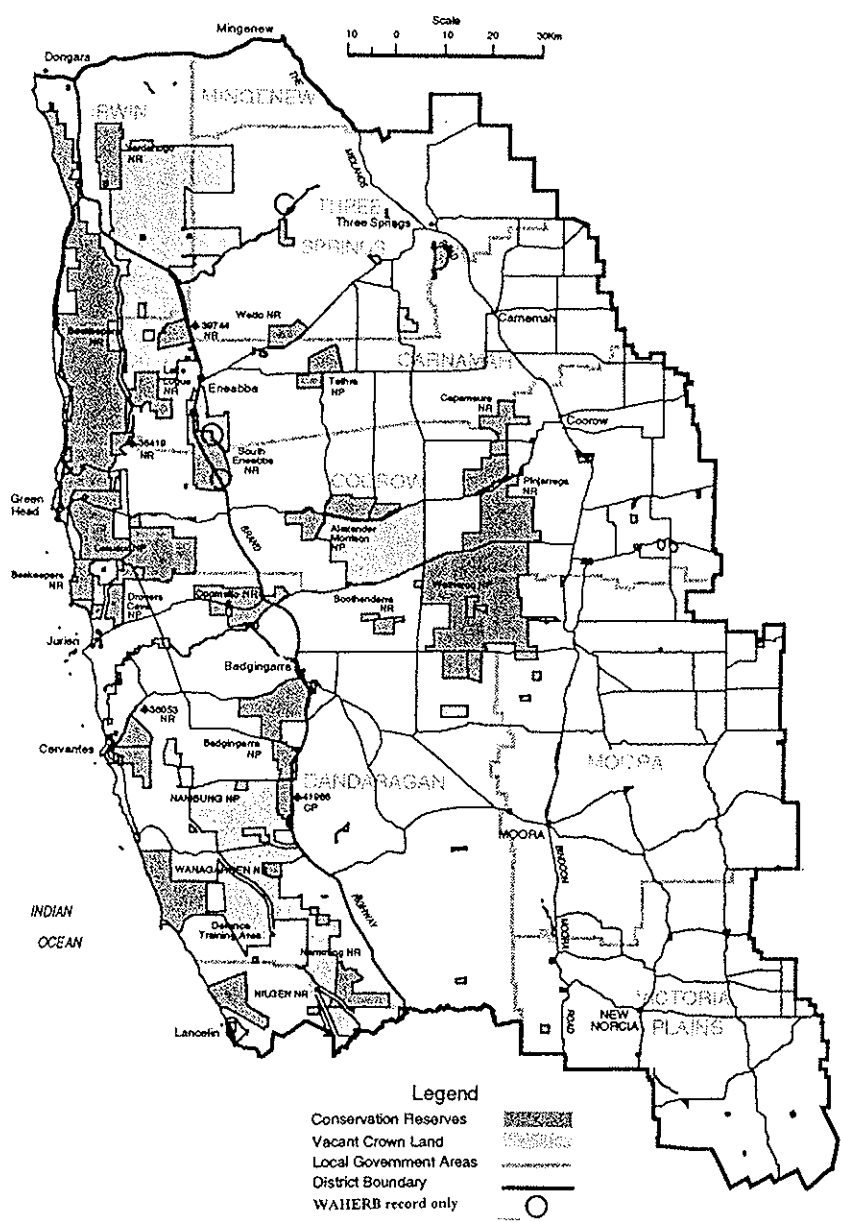
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required.

**References**

D. Corbyn (personal communication), Marchant *et al.* (1987), Wilson (1981).



F.B.  
1 CM

*Mesomelaena stygia* subsp. *deflexa*

A slender, upright shrub to 40 cm tall, the leaves overlapping and appressed to the stem, broad at the base, 1-2 mm long, with 6-9 ribs, terminating in an incurved, pungent point. The flowers are white, with 3-5 flowers on each peduncle, in dense spikes at the ends of the branches. Each flower is small, bell-shaped, with five glabrous petals 1 mm long, above the tube, and five stamens with filaments inserted at the top of the tube. There is a two-lobed stigma and the ovary is two-celled.

**Flowering Period:** August-October

#### **Distribution and Habitat in the Moora District**

Known from one population near the southern boundary of the Moora District and from another population in the Swan Region 12 km to the south-west. Earlier records indicate that it also occurred to the north of Mogumber, ca. 14 km to the west.

The species has also been collected recently from west of Bruce Rock and near Hyden, in the Narrogin District of the Wheatbelt Region, giving a total geographic range for the species of over 300 km and a total of 1700+ plants.

Occurs in the Moora District on low rises or near the crest of ridges, on cream loam with quartzite gravel, in open shrub mallee over dense heath, with associated species including *Eucalyptus accedens*, *Dryandra armata* and *Melaleuca uncinata*. Elsewhere it is recorded on white clay quartz sand below breakaways.

#### **Conservation Status**

Current: Priority 2

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. S of New Norcia	VP	Nature Reserve	10.9.1991	100+	Undisturbed
2.* Babilion Hills	VP	-	25.9.1934	-	-

#### **Response to Disturbance**

Unknown

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

Presumed susceptible

#### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

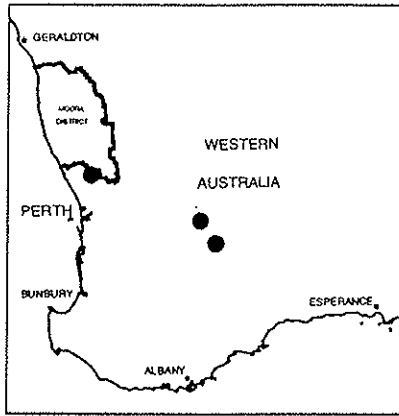
#### **Research Requirements**

- Further survey is required.

#### **References**

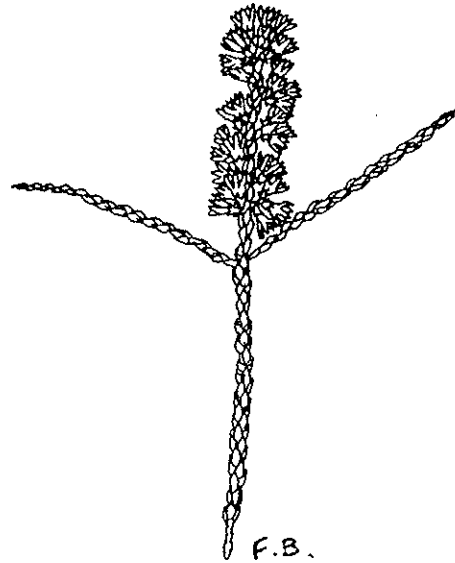
Blackall and Grieve (1981), Diels and Pritzel (1905).





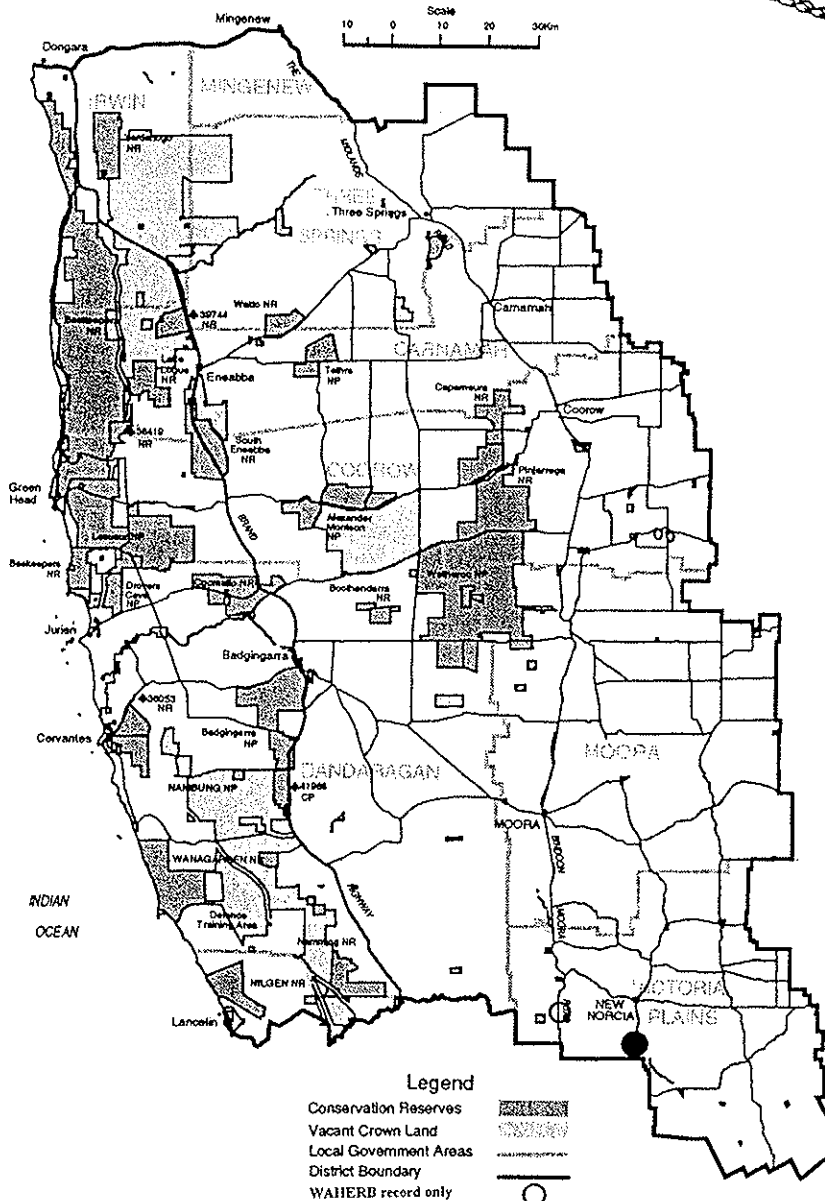
Locality Map

● *Monotoca leucantha*



F.B.

5 mm



A diffuse, sprawling shrub to 40 cm tall, with terete branchlets, and stipules present at the base of the leaves. The leaves are opposite, elliptic, broadly ovate or broadly obovate, the upper surface glabrous and faintly reticulate, the lower surface covered with short silky hairs and with an open reticulation. There are 6-8 flowers in each axillary cluster. The calyx is covered with long, soft hairs and has five lobes, the lower three are acute, the upper two blunt. The flowers are pea-shaped, the petals yellow and dark red in colour. The standard petal is 10-11 mm broad. There are four ovules in the ovary and the fruit is a pod.

This species can be distinguished from *Nemcia reticulata* by its smaller flowers, obtuse upper calyx lobes and elliptic leaves. The standard petal in *N. reticulata* is 14-15 mm broad, the upper calyx lobes are blunt and the leaves are obovate to linear in shape.

Originally described as *Gastrolobium axillare* by Meisner in 1855, but since 1864 has been treated as *Oxylobium reticulatum* var. *gracile* (Bentham 1864), until 1923 when it was included in *Nemcia* by Domin. In 1987 the classification of *Gastrolobium* was revised by Crisp and Weston, who resurrected the genus *Nemcia* from synonymy and expanded it to include species of *Gastrolobium* with trifid bracts and condensed inflorescences.

**Flowering Period:** August-November

#### Distribution and Habitat in the Moora District

The species is known over a range of 100 km from Regans Ford to the Lesueur area, and extending south of the Moora District to Bindoon.

It occurs on grey or white sand, loamy sand or brown loam and laterite, or lateritic gravel over clay, in low heath usually on slopes below breakaways.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SE of Cataby	D	MRWA Road Verge	30.7.1991	10+	Disturbed
2. SE of Cataby	D	Nature Reserve	30.7.1991	3	Undisturbed
3. Coomallo	D	Nature Reserve	11.9.1993	10+	Healthy
4.* NW of Mt Lesueur	D	National Park	27.8.1979	-	-
5.* Wolba Road	D	-	11.8.1988	-	Disturbed
6. N of Dandaragan	D	Shire Road Verge	13.8.1991	1	Undisturbed
7. Mimegarra Road	D	Shire Road Verge	11.9.1991	1	Undisturbed
8. W of Dandaragan	D	Private	25.9.1991	5+	Undisturbed
9. Minyulo	D	Nature Reserve	26.9.1991	5+	Undisturbed
10. Minyulo	D	Nature Reserve	26.9.1991	1	Undisturbed
11. Waddi Road	D	Shire Road Verge	26.9.1991	5+	Undisturbed
12. Badgingarra	D	National Park	20.10.1992	10+	Plants on edges of firebreak
13. Banovich Road	D	Shire Road Verge	18.11.1992	10+	Undisturbed
14. Coomallo	D	Nature Reserve	18.11.1992	30+	Undisturbed
15. NW of Cataby	D	VCL	15.9.1993	10+	Healthy

#### Response to Disturbance

At population 12 most plants were situated along the edge of a firebreak.

## Susceptibility to *Phytophthora* Dieback

Presumed susceptible

### Management Requirements

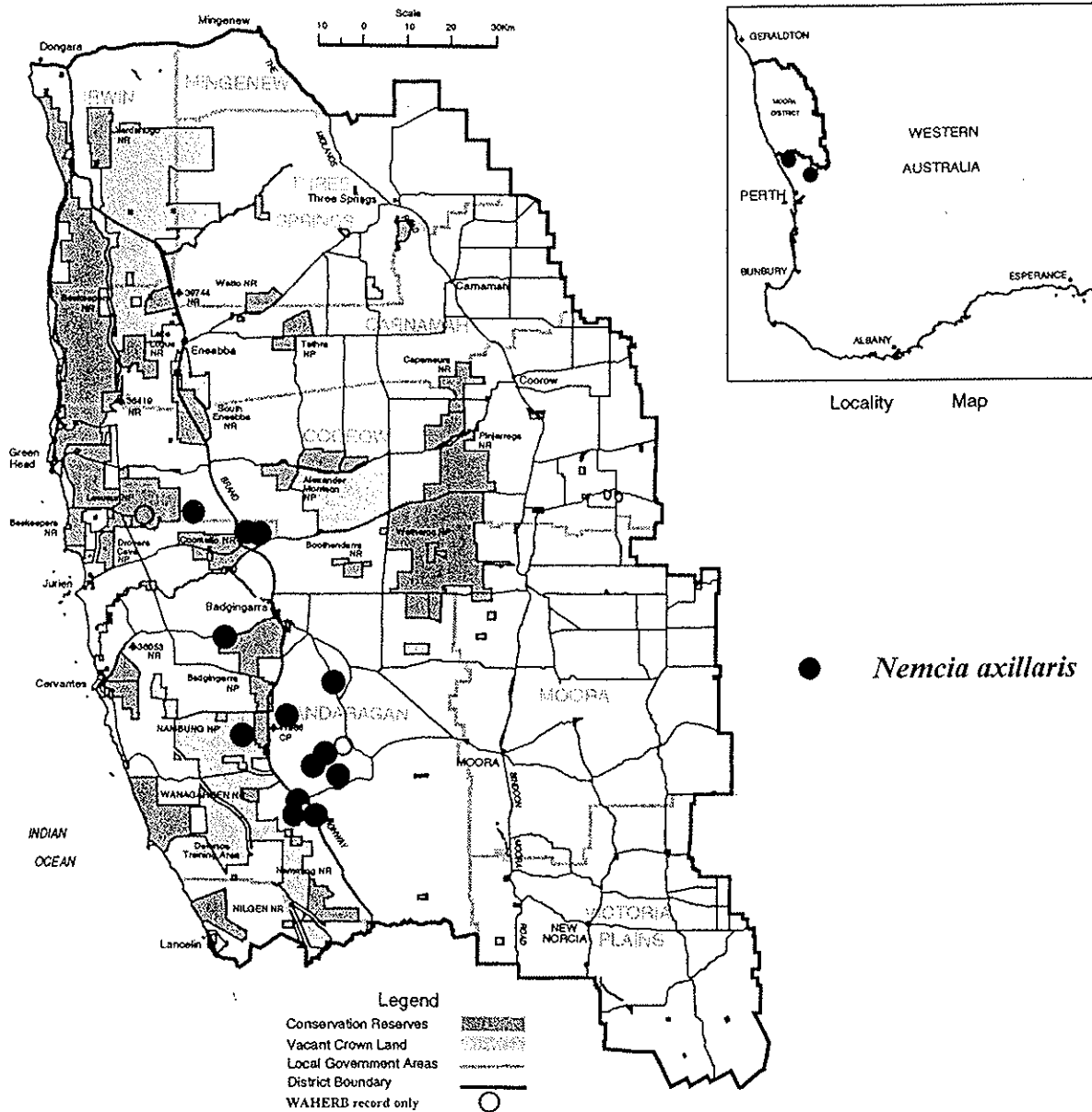
- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that markers are in place at road verge populations.
- Maintain liaison with landowners.

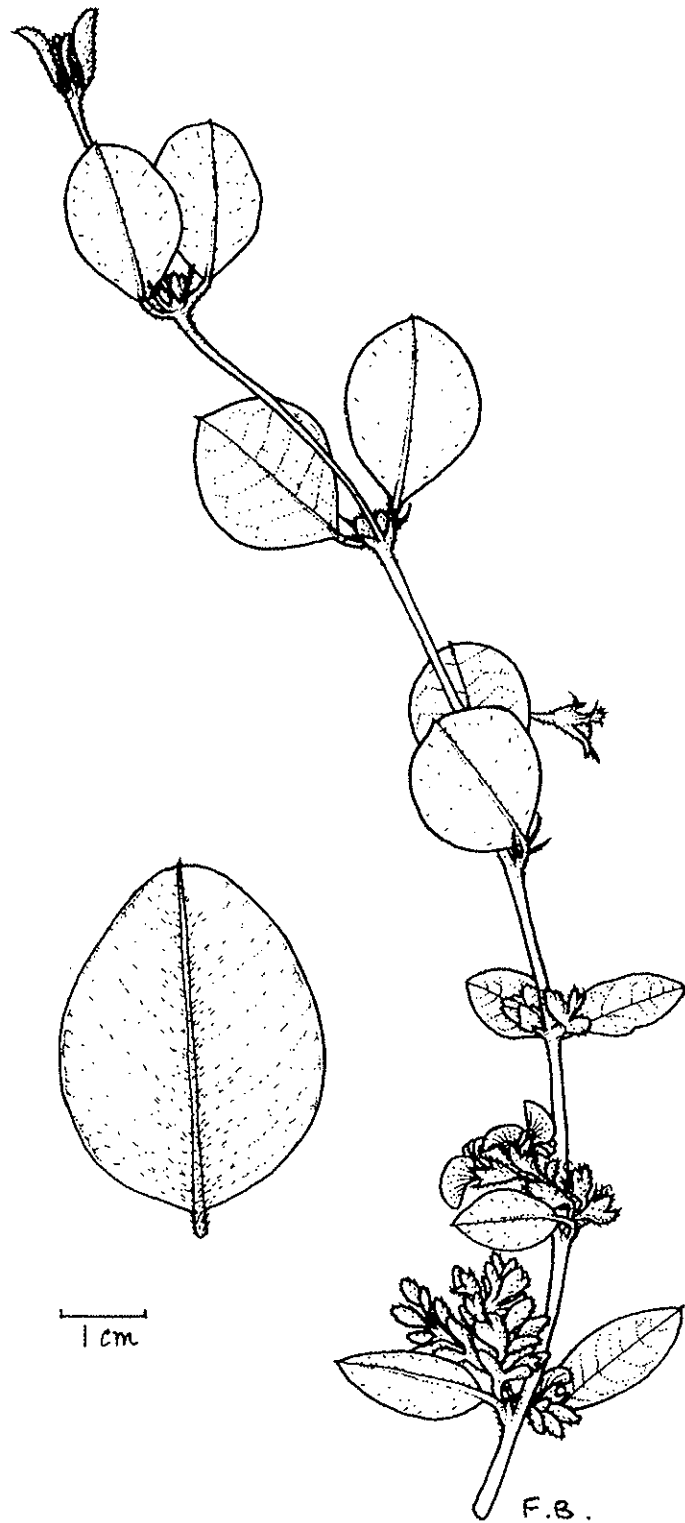
### Research Requirements

- Further survey is required, particularly to refind populations 4 and 5.

### References

Bentham (1864), Crisp and Weston (1987), Crisp and Mollemans (1993), Domin (1923), Marchant *et al.* (1987), Meisner (1855).





*Nemcia axillaris*

This species was first described in 1990 and is known from five collections, the earliest made in 1984.

It is a perennial herb to 50 cm tall, with a spreading woody rootstock producing a tussock to 40 cm across. The leaves are linear, up to 20 cm long and 5 mm wide, spirally twisted. The leaf margins have fringes of soft hairs which point towards the centre of the leaf. The spathe is up to 25 cm long, 1-2 mm wide. It is brown, with thin, almost transparent margins, and is lanceolate in shape and up to 26 mm long. The flowers have three broad, spreading sepals to 19 mm long and 14 mm wide, blue-violet in colour. There are three upright blue-violet petals about 1 mm long. The three yellow stamens are 7-8 mm long and the style has three stigmatic lobes.

*Patersonia spirifolia* is related to two other species which form tussocks. It differs from *P. inaequalis* in the purple rather than white flowers and brown rather than green spathes, and from *P. drummondii* in the fringed leaf margins and shorter brown spathes.

**Flowering Period:** October-November

#### **Distribution and Habitat in the Moora District**

It has been recorded from a very restricted range of less than 10 km in the Badgingarra area, where it grows in sand over laterite in low heath.

#### **Conservation Status**

Current: Priority 2<sup>#</sup>

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* Badgingarra	D	National Park	15.10.1988	-	-
2.* Cadda Road	D	Shire Road Verge	15.10.1988	-	-
3.* Bibby Road	D	-	-	-	-

#### **Response to Disturbance**

Unknown

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

Presumed susceptible

#### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

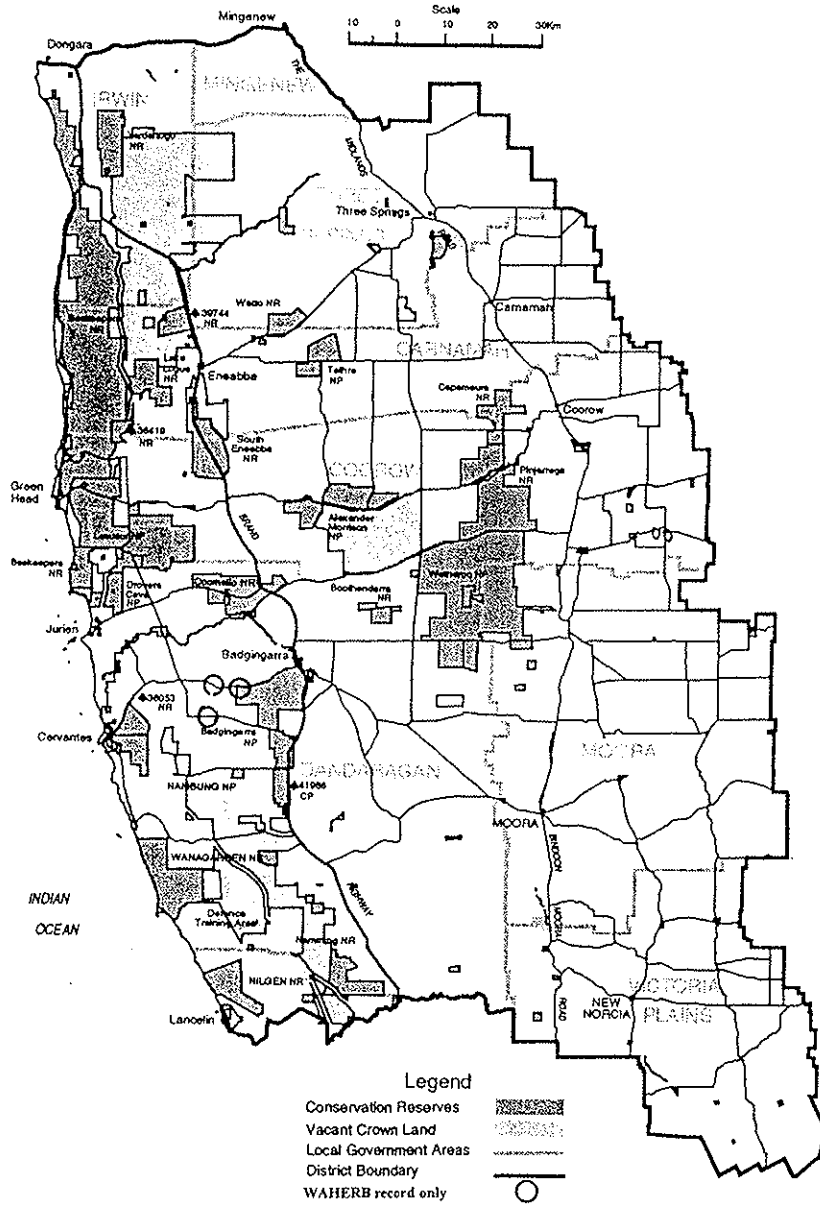
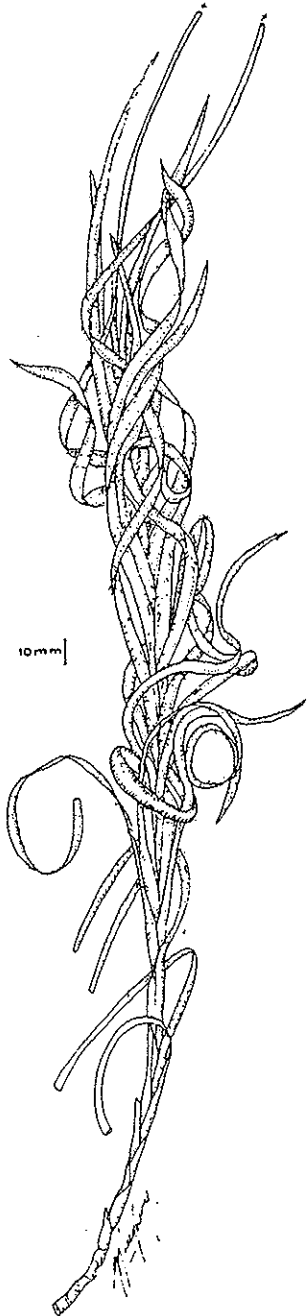
#### **Research Requirements**

- Further survey is urgently required.

#### **References**

Keighery (1990).

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



*Patersonia spirifolia*

A rounded shrub to 2 m in height, with stiff, terete, linear leaves with sharp points and five longitudinal grooves. They are 2-8 cm long, 0.9-1.3 mm broad, often crowded. The flowers are borne in terminal or axillary racemes from the axils of small triangular scale leaves, 0.5-2 mm long. There are 5-30 flowers in each raceme. The flowers are divided into four bright yellow, glabrous tepals each of which is recurved in the upper part and has an anther inserted just below the middle. Each anther has a whitish, globular appendage. The ovary is hairy and the style projects beyond the tepals. The fruit is a warty, elongated drupe, with a succulent outer coat.

*Persoonia chapmaniana* is distinctive, resembling only *P. pentasticha* which occurs further north, and from which it differs in the densely hairy ovary, and glabrous tepals.

**Flowering Period:** September-November

#### Distribution and Habitat in the Moora District

Has been found recently between Moora and Three Springs and is also known from outside the Moora District between Kalannie and Kulja on the west side of Lake Moore in the Merredin District.

Grows on yellow sandy loam over clay or white to grey sandy clay, in York gum woodland, in open scrub or in open, low woodland of *Banksia* and *Actinostrobus* species, usually near lakes.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Marchagee	Co	Nature Reserve	17.10.1991	20	Undisturbed
2. E of Gunyidi	Co	Shire Reserve	20.11.1992	1	Healthy
3. W of Coomberdale	M	Shire Road Verge, Private	17.10.1991	5	Undisturbed
4. E of Coorow	Co	Shire Road Verge, Private	17.10.1992	86	Undisturbed
5. SE of Coorow	Co	Private	16.10.1991	10	Undisturbed
6.* W of Winchester	Ca	Private	4.1.1989	-	-
7.* Carnamah	-	-	30.10.1906	-	-

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

#### Management Requirements

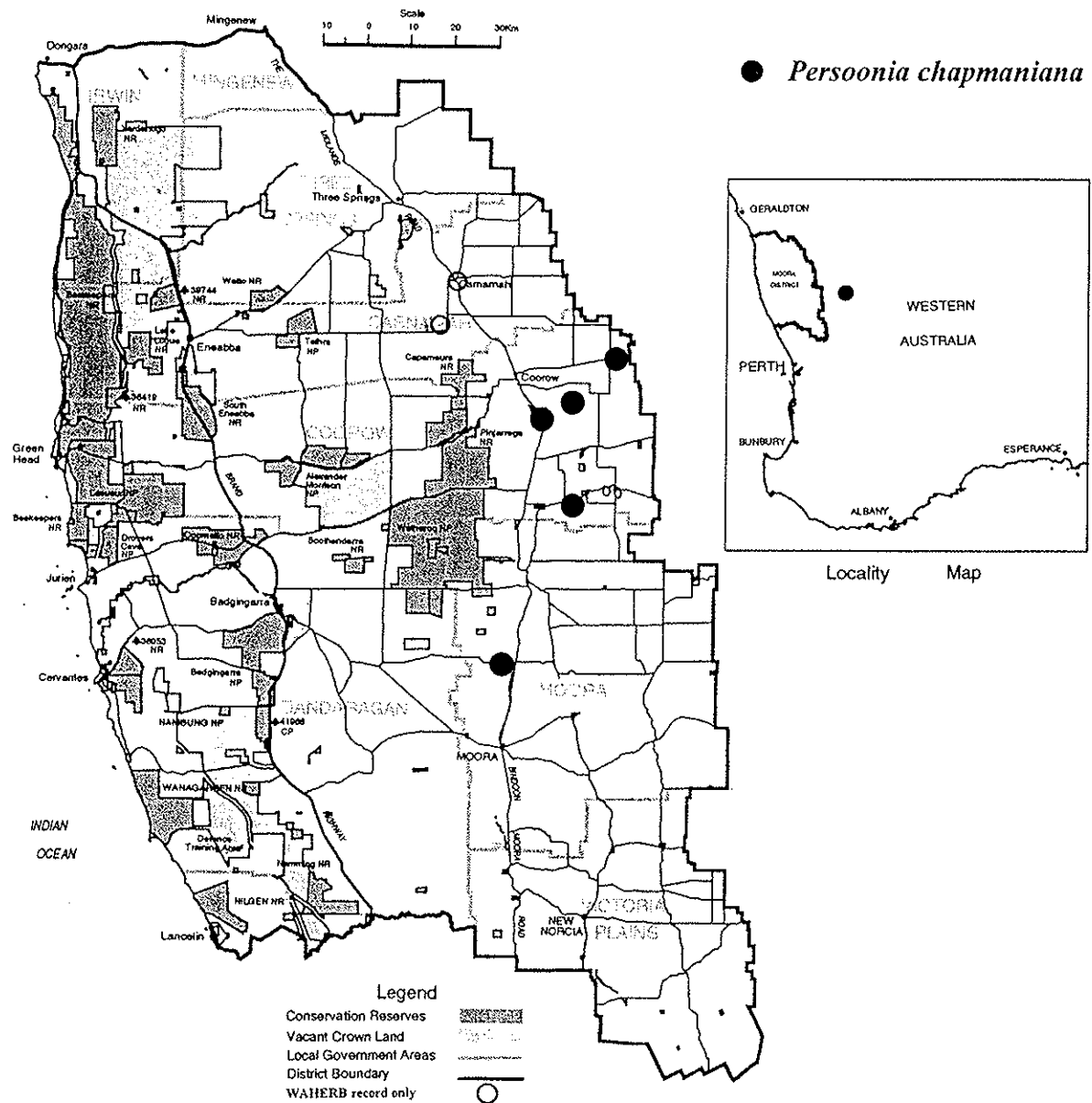
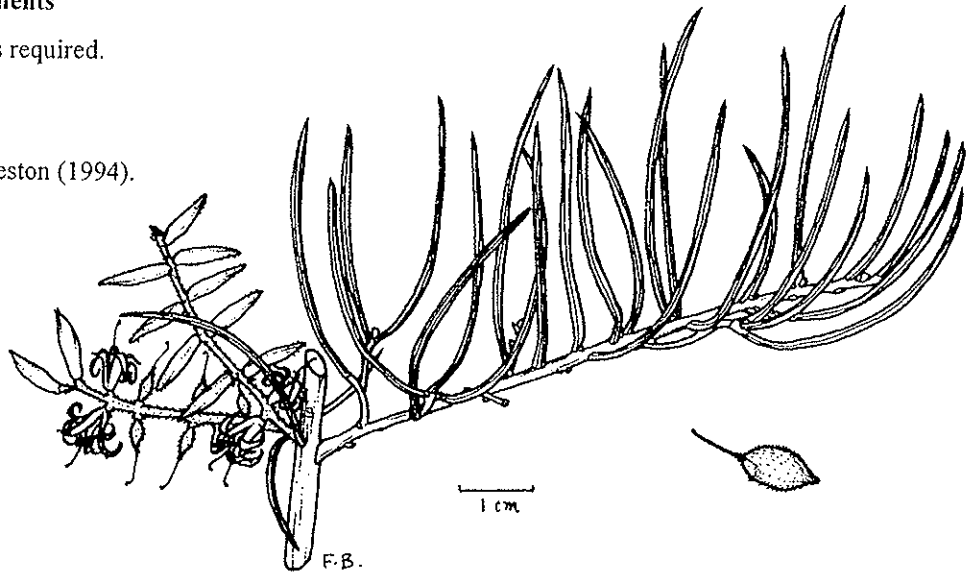
- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that road verge populations are marked.
- Maintain liaison with private landowners.

## Research Requirements

- Further survey is required.

## References

Bentham (1870), Weston (1994).





*Persoonia filiformis* P.H.Weston

PROTEACEAE

[*Persoonia* sp. Eneabba (E.A.Griffin 795)]

A small, lignotuberous shrub to 30 cm tall with several erect stems. The leaves are terete, ribbed and stiff with sharp tips. They are ca. 1-2 cm long, and ca. 0.7-1 mm broad. They are erect and crowded on the branches. The hairs on the young shoots are less than 1 mm long, the mature shoots become glabrous. The flowers are narrow, glabrous on the outside, ca. 15 mm long, yellow in colour. The anthers have appendages, which are triangular at the base, narrowing to a filiform, often sinuate tip 2-4.5 mm long. The appendage is abruptly reflexed through 90-180 degrees. The ovary is glabrous, the style is thick and straight with a thickened stigma, and is about as long as the stamens.

The name *filiformis* refers to the threadlike anther appendage, which distinguishes this species from all others in the genus.

**Flowering Period:** November, January

**Distribution and Habitat in the Moora District**

Occurs from the Arrowsmith area to the Lesueur area, and south to Badgingarra.

Grows in white sand over lateritic gravel, or yellow sandy gravel, in low open heath sometimes on the upper slopes of mesas.

This taxon came to notice during the course of this survey, so was not specifically searched for. There are large areas of uncleared suitable habitat throughout its range.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.*NW of Mt Lesueur	D	National Park	22.11.1979	-	-
2.*S of Eneabba	Ca	-	12.11.1976	-	-
3.*W of Mt Peron	-	-	15.11.1971	-	-
4.*E of Jurien Bay	D	Nature Reserve	11.12.1980	-	-
5.*Skipper Road	-	-	12.1980	-	-
6.*Brand Highway	-	-	11.1981	-	-
7.*W of Badgingarra	D	-	11.1967	-	-

**Response to Disturbance**

Regenerates after disturbance from the lignotuber.

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

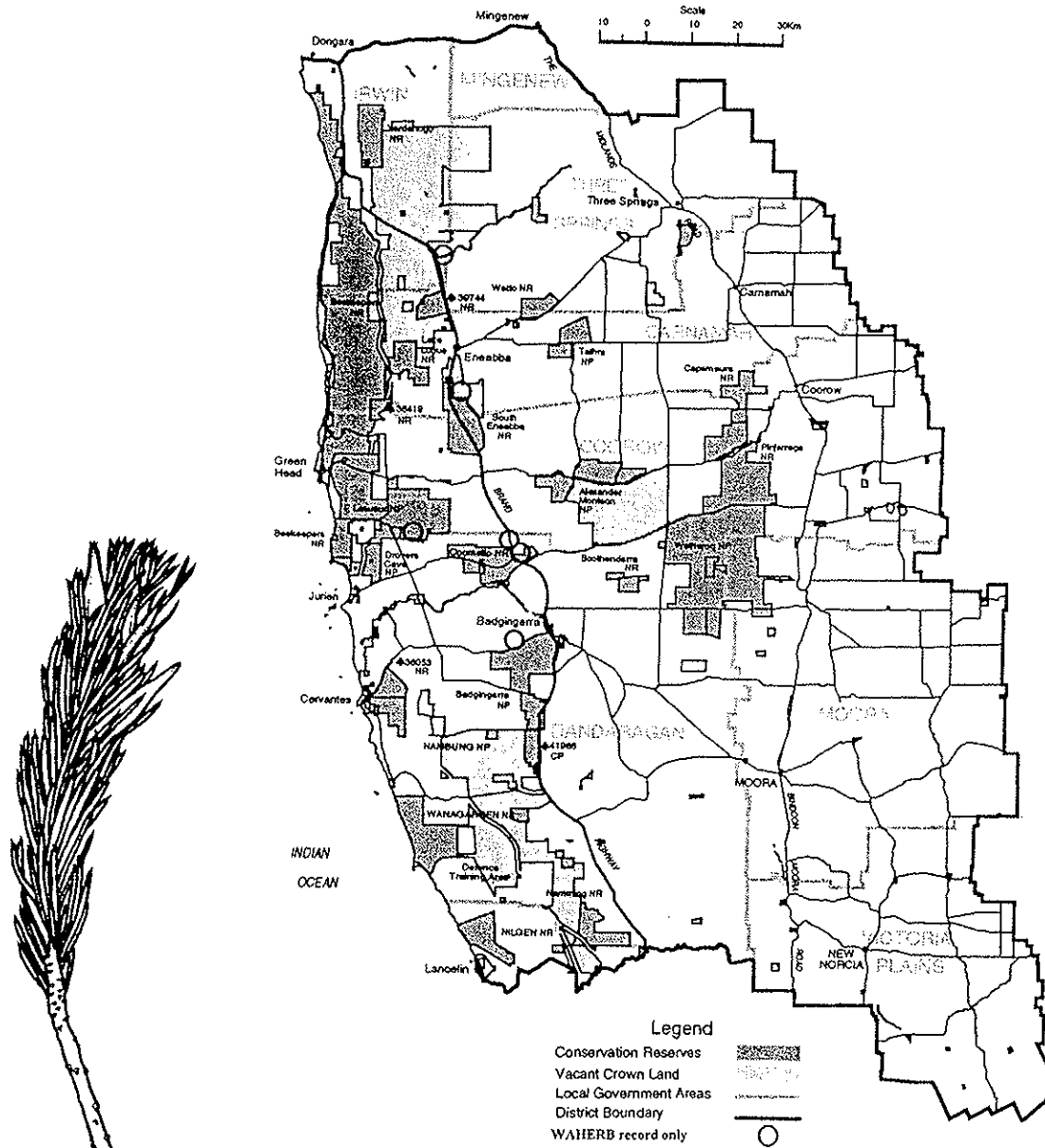
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

– Further survey is necessary to refine all previously vouchered populations.

**References**

Weston (1994).



F.B.

1cm

*Persoonia filiformis*

An annual herb with ascending to erect main stems. The leaves are linear, to 4.5 cm long, succulent and green, red or purple in colour. The flower heads are distinct, up to 2.8 cm long, cylindrical in shape. There are tubular florets only and the flower head is surrounded by outer involucre bracts which are herbaceous, appressed, and linear to lanceolate in shape. The florets are mainly yellow in colour, with the upper part of the tube usually purple. The fruit is an achene up to 1.9 mm long. It has one pappus bristle at its apex, not five as in other species of *Podotheca*. This separates the species from *P. pritzelii* which also has more succulent outer herbaceous bracts around the flower head, which are bright green, not tinged purple. *P. gnaphalioides* is also difficult to separate except by the number of pappus bristles but there is an ecological difference in that at the type locality it grows mainly under *Melaleuca*, extending only to the outer edge of the samphire zone where it grows with *P. uniseta*.

**Flowering Period:** September-November

#### **Distribution and Habitat in the Moora District**

In the Moora District, this species has been reported as occurring in a sandy area near a small lake in a nature reserve west of Marchagee. This population was not refound during the survey.

Has been collected from Lake Monger and south of Morawa in the Geraldton District and from the eastern edge of Lake Moore and from south of Pithara in the Merredin District. The total distribution range for the species is ca. 130 km.

In populations known from other districts it has been found growing in the samphire zone around saltlakes, on pale red sandy loam, grey or white coarse sand/clay or gravelly loam, sometimes extending into the *Melaleuca* shrub zone. In the Moora District it occurs on flats or depressions in woodland of *Eucalyptus camaldulensis*, or low scrub with hummock grasses.

#### **Conservation Status**

Current: Priority 2

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. W of Marchagee	Co	Nature Reserve	14.9.1991	-	-
2. NE of Badgingarra	D	National Park	6.12.1992	-	-
3. SW of Three Springs	TS	Reserve, Aboriginal purposes	6.10.1992	-	-

#### **Response to Disturbance**

Unknown

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

Unknown

#### **Management Requirements**

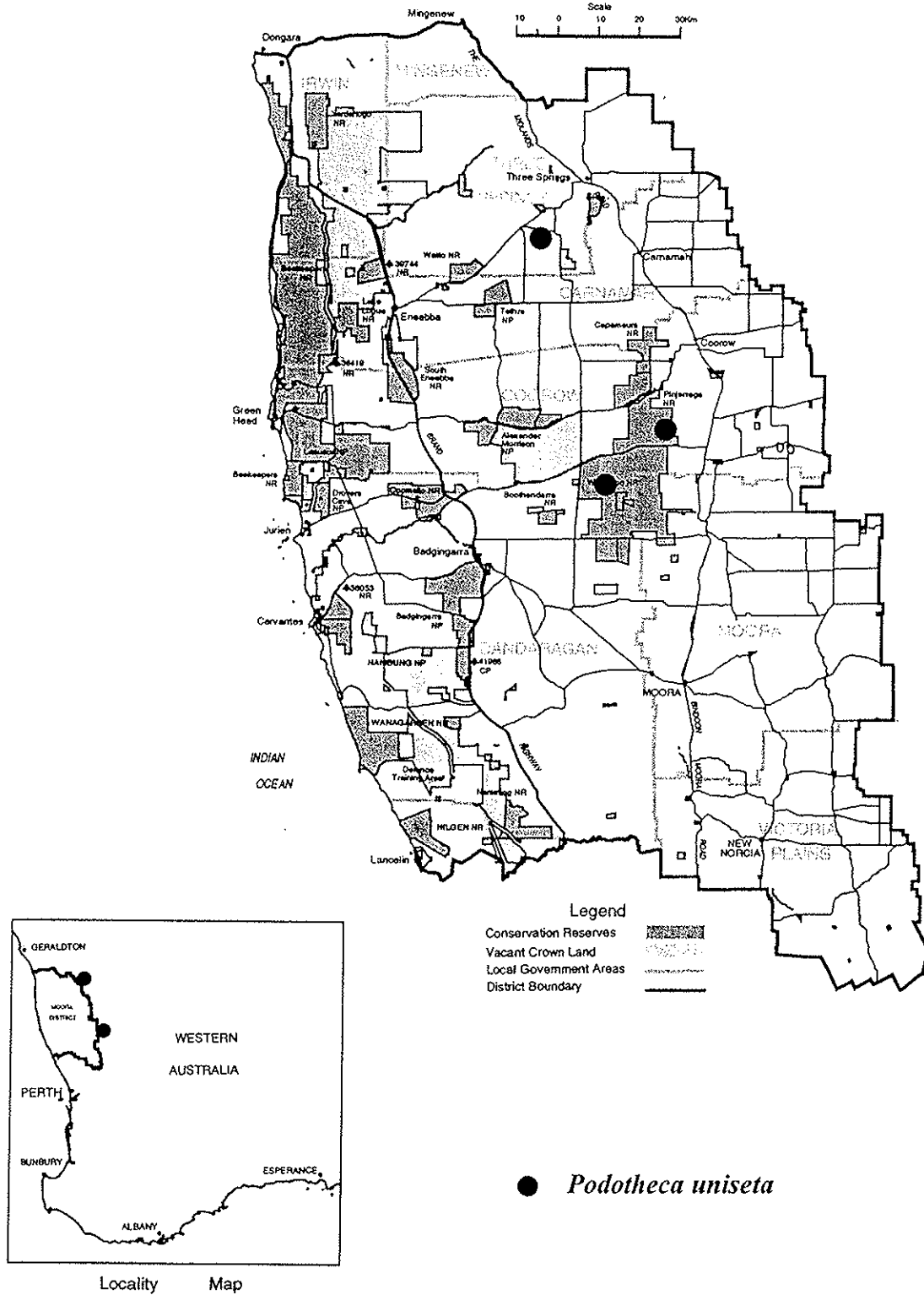
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required.

**References**

Short (1989).



**Schoenus sp. Warradarge (E.A.Griffin 3842)**

## CYPERACEAE

An undescribed taxon related to *Schoenus indutus*.

An erect to spreading, mid-dense, perennial, tufted sedge, 60-65 cm x 44-55 cm. The stems are slender, terete, medium green in colour, clothed in dense, white, stellate hairs at the base. The inflorescence is a panicle 6-8 cm long, the narrow spikelets on pedicels ca. 5 mm long.

**Flowering Period:** August

**Distribution and Habitat in the Moora District**

Grows in white or grey sand with laterite in low heath or mallee heath often on uplands. Associated species include *Hakea obliqua*, *Eucalyptus todtiana*, *E. drummondii*, *Nuytsia floribunda*, *Lambertia multiflora* and *Calothamnus sanguineus*.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Coorow-Greenhead Road	Co	Shire Road Verge	30.4.1992	20	Some disturbance
2. Marchagee Track	Co	Shire Road Verge	29.4.1992	30-40	Undisturbed
3. S of Dandaragan	D	Private	10.9.1988	-	-
4. NE of Regans Ford	D	Nature Reserve	27.6.1988	-	-
5. Alexander Morrison	Co	National Park	21.10.1987	Occasional	-
6. SSE of Eneabba	Ca	-	7.11.1984	-	In area of regrowth from cleared and fertilised farm
7.* N of Eneabba	-	-	27.10.1981	Rare-WH	-
8.* E of Eneabba	Co	Reserve	22.11.1978	Uncommon-WH	-
9.* W of Winchester	Ca	-	24.8.1965	-	-
10.* W of Winchester	Ca	-	24.8.1965	-	-
11.* W of Watheroo	Mo	-	19.9.1958	-	-

**Response to Disturbance**

Population 6 had regenerated from cleared and fertilised farmland.

**Susceptibility to *Phytophthora* Dieback**

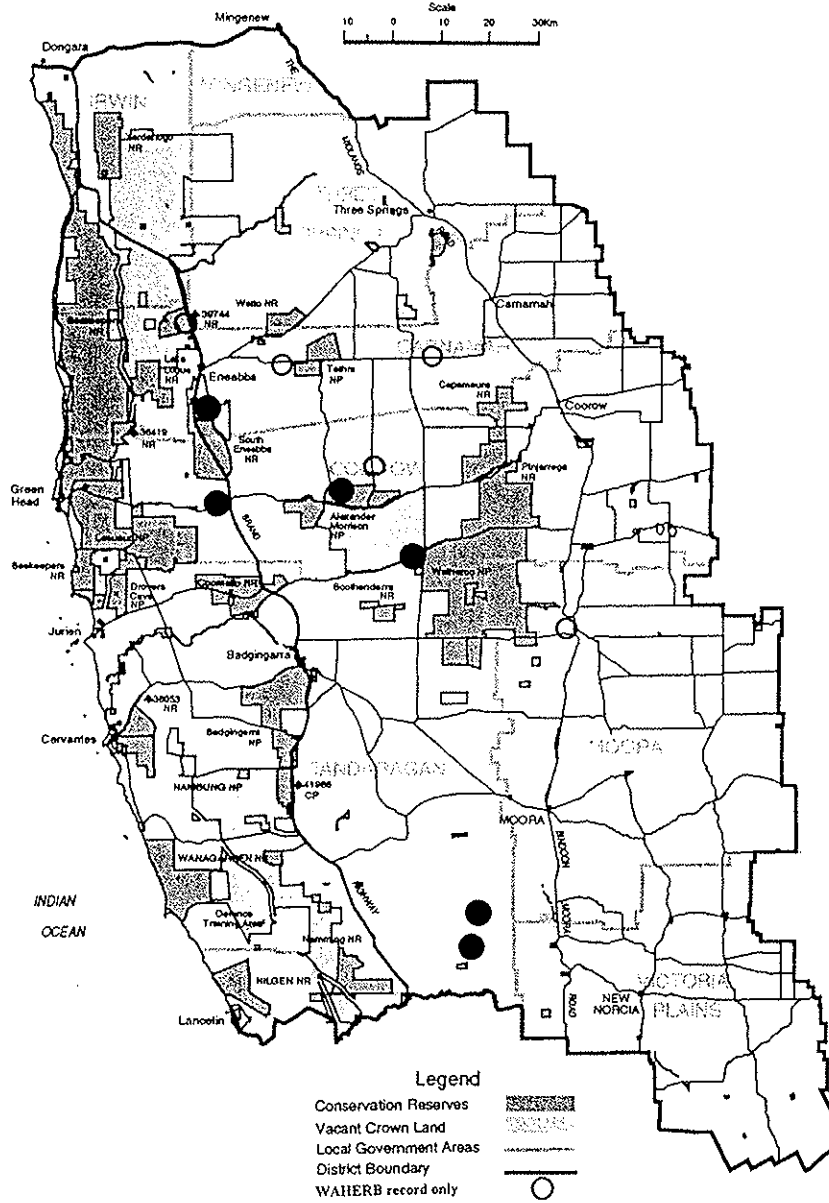
Unknown

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required.



● *Schoenus* sp. Warradarge (E.A.Griffin 3842)

## ***Schoenus* sp. Wongan (E.A.Griffin 3841)**

CYPERACEAE

An undescribed taxon, related to *Schoenus obtusifolius*.

A tufted herb to 10 cm tall. The basal leaf sheaths are broad, white and membranous. The leaves are scabrous, linear, pale green in colour. The sheaths of the upper leaves are white and membranous, with the upper margin with long white, woolly hairs, which surround the small, sessile, few-flowered spikelets.

**Flowering Period:** September-October

### **Distribution and Habitat in the Moora District**

This species has been collected from two localities in the Moora District from south of Eneabba. It has also been recorded from the Wongan Hills.

Grows in grey or white sand over laterite, in low heath.

### **Conservation Status**

Current: Priority 2

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* SSE of Eneabba	Ca	-	7.11.1984	-	-
2.* S of Eneabba	Ca	-	28.9.1977	-	-

### **Response to Disturbance**

Regrowth stimulated by disturbance on firebreak and cleared land.

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

Unknown

### **Management Requirements**

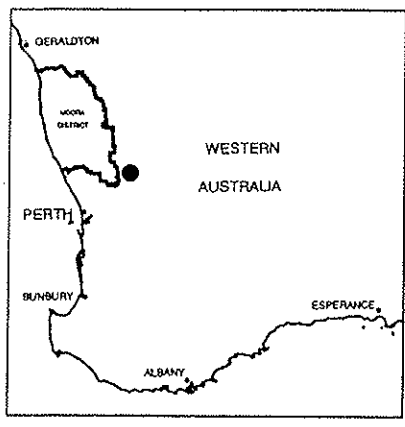
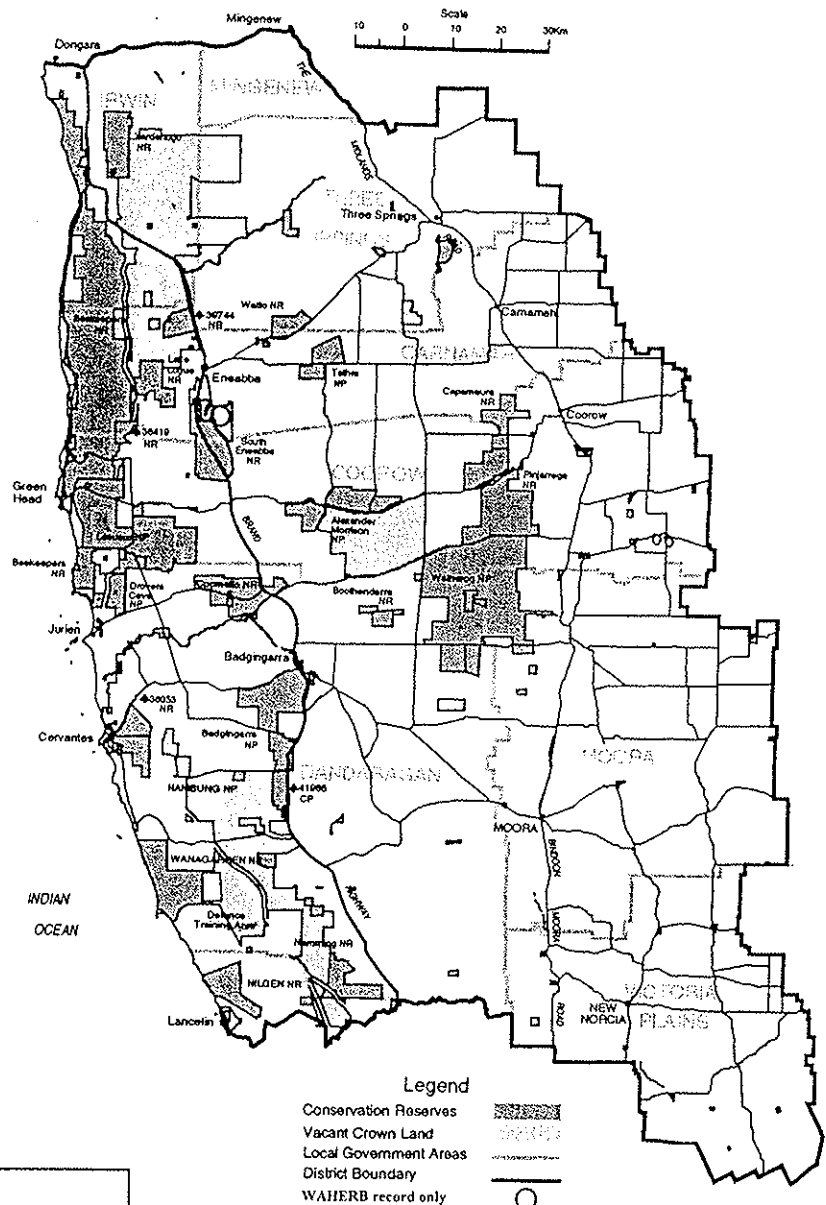
- Ensure that dieback hygiene procedures are carried out at all populations.

### **Research Requirements**

- Further survey is required
- Taxonomic work requires completion.

### **References**

K. Wilson (personal communication).



Locality Map

● *Schoenus* sp. Wongan (E.A.Griffin 3841)



*Stenanthemum grandiflorum* ms is a low shrub 0.3-0.6 m tall. The leaves are alternate and grow mainly on the young branches. They are narrow and folded with a recurved, acute tip and are 6-15 mm long. The flowers are grouped in clusters, ca. 1 cm in diameter, surrounded by broad, overlapping, sharp-pointed bracts which are brown in colour. Each flower has a short but distinct stalk. The calyx is covered with fine, silky hairs, and is 6-7 mm long, tubular above the ovary and disc with five acute lobes ca. 2.5 mm long. There are five petals, hood-shaped, enclosing the anthers. They are white to pink in colour, 0.75 mm long. The ovary is three-celled and inferior and the fruit is a capsule opening by two valves.

This species was described by C.A. Gardner in 1942 as *Cryptandra grandiflora*.

Barbara Rye has reinstated the genus *Stenanthemum* as originally described by Reissek including elements of *Cryptandra* and *Spyridium*, not included by Bentham in 1863; however further taxonomic research is required for this species.

**Flowering Period:** August-September

#### **Distribution and Habitat in the Moora District**

One population was found during the survey near Watheroo and the species has been collected in 1968 near Coorow, 45 km to the north. Another collection made in 1968 indicates that the species has occurred further west between Watheroo and Eneabba. A collection made in 1947 at Wongan Hills is ca. 90 km south-east of the only recently surveyed population, so that the species has had a geographic range of at least 120 km in the past.

The population found during the survey was growing in yellow-brown sandy loam with granite, amongst low open scrub to 1.5 m and low heath to 0.5 m on south-east facing gentle slopes. Associated species included *Hypocalymma* sp., *Acacia* sp. and *Grevillea christineae*. It has also been recorded growing in grey sandy soil.

This species is represented by seven collections in the Western Australian Herbarium and had not been collected for 25 years until found near Watheroo late during this survey. As it had not been included in the list for the District previously, more survey work is required in the Moora District and also in the Merredin District where it was collected at Wongan Hills in 1947.

#### **Conservation Status**

Current: Priority 2

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. NE of Watheroo	Mo	Private	11.9.1993	1+	Undisturbed
2.* Between Eneabba and Watheroo	-	-	6.9.1968	-	-
3.* E of Coorow	Co	-	13.9.1968	-	-

#### **Response to Disturbance**

Unknown

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

Unknown

### Management Requirements

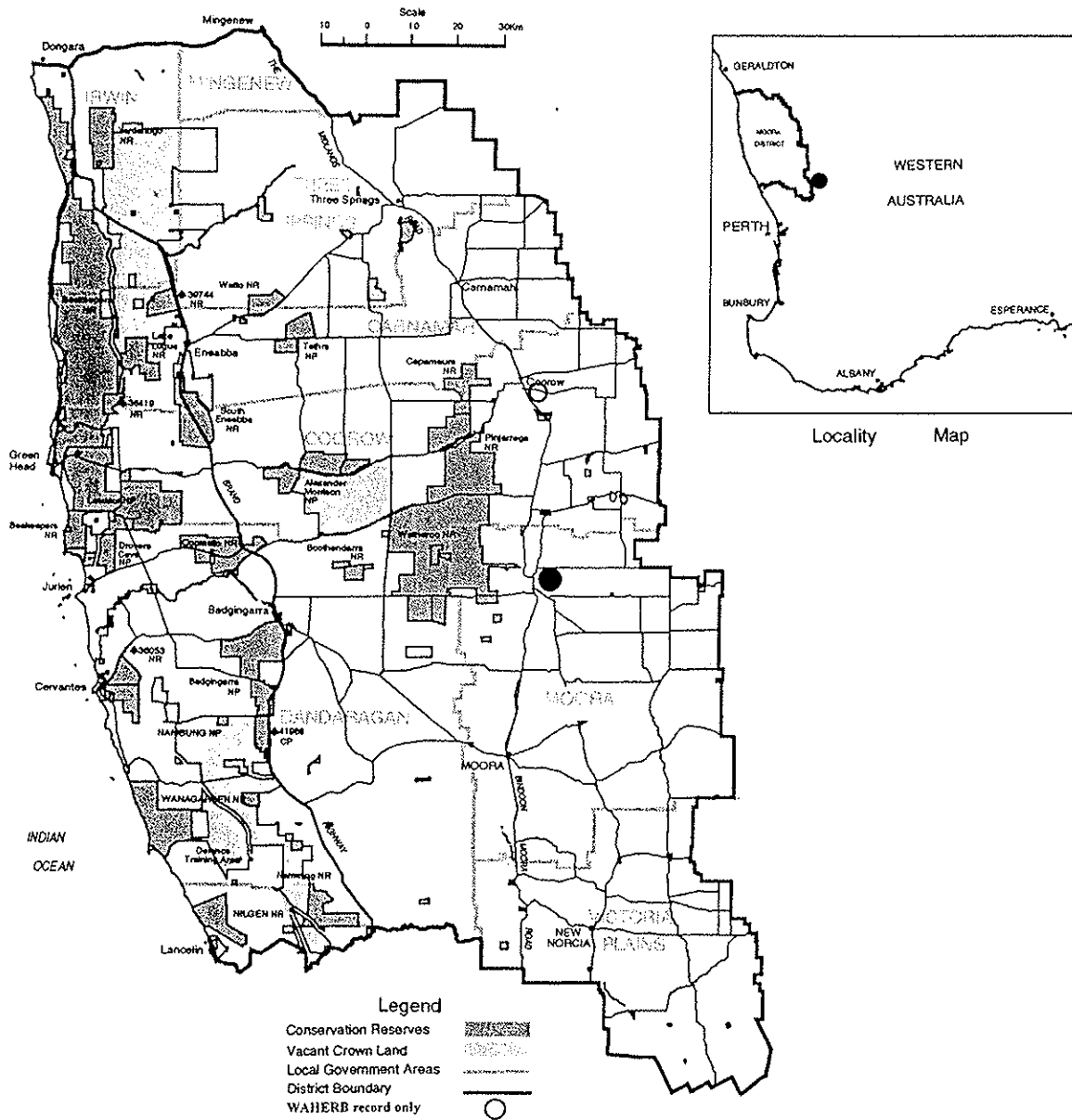
- Ensure that dieback hygiene procedures are carried out at all populations.
- Maintain liaison with landowner.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

### Research Requirements

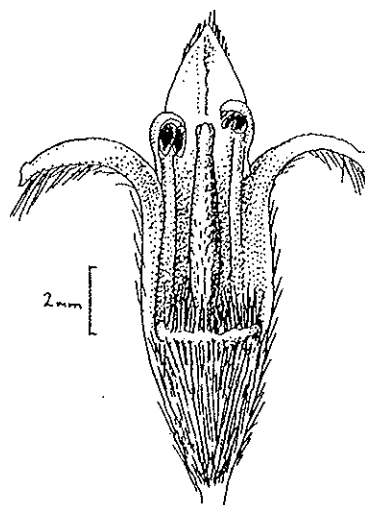
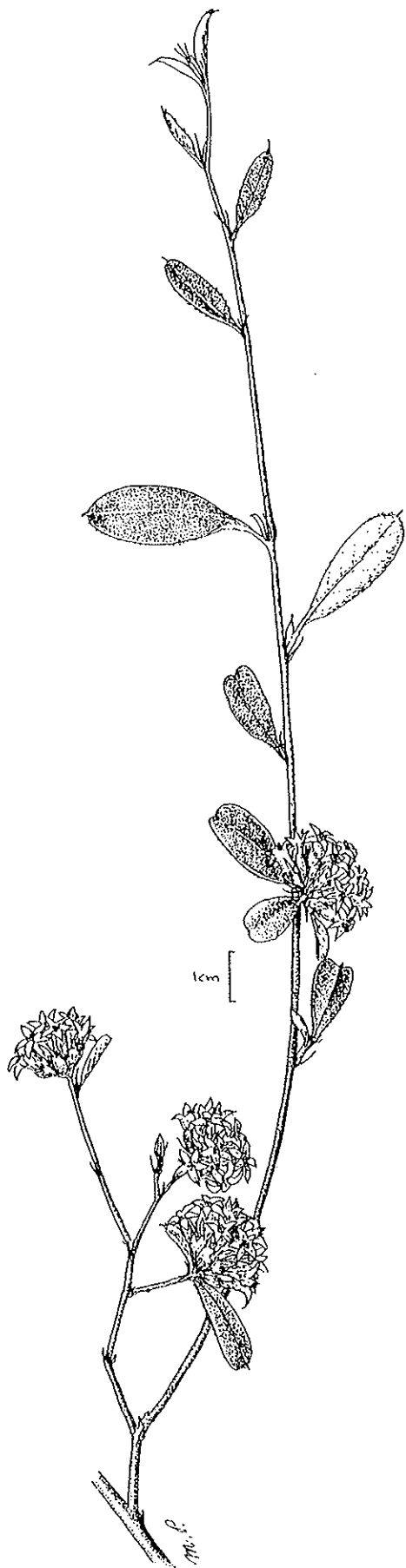
- Further survey is required.
- Further taxonomic research is required.

### References

Bentham (1863), Gardner (1942), B. Rye (personal communication).



● *Stenanthemum grandiflorum* ms



*Stenanthemum grandiflorum* ms

## *Stenanthemum limitatum* Rye

RHAMNACEAE

This species was known as *Cryptandra* sp. (Lesueur) A.S.George 12893 until a recent taxonomic revision by Barbara Rye who has reinstated the genus *Stenanthemum* Reissek.

*S. limitatum* is an erect to spreading shrub, to 1 m tall but usually shorter. The simple leaves are 6-17 mm long, 3-8 mm wide, on short stalks to 1 mm long. They are widest at the tip, narrowing towards the stalk. The tip is indented giving the leaf a heart shape. In colour the leaves are dark green above, with a pale, densely-hairy lower surface.

The short-stalked flowers are clustered in the axils of the leaves. They are cream to white in colour, with a petal tube ca. 2.5 mm long with five spreading lobes ca. 1.5 mm long.

The specific name refers to the limited range of the species.

**Flowering Period:** October-November

### **Distribution and Habitat in the Moora District**

This species has been collected from three localities over a range of 8 km to the east of Jurien Bay. It grows in low woodland over open low heath, in grey sand with lateritic duricrust and gravel, grey-orange sandy lateritic gravel and sandy loam, and in white sand over sandstone, at the upper edge of breakaways.

### **Conservation Status**

Current: Priority 2

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.*Mt Lesueur	D	National Park	17.7.1979	-	-
2.*NE of Mt Lesueur	D	National Park	11.10.1979	-	-
3.*NE of Mt Lesueur	D	National Park	12.11.1979	-	-

### **Response to Disturbance**

Unknown

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

Unknown

### **Management Requirements**

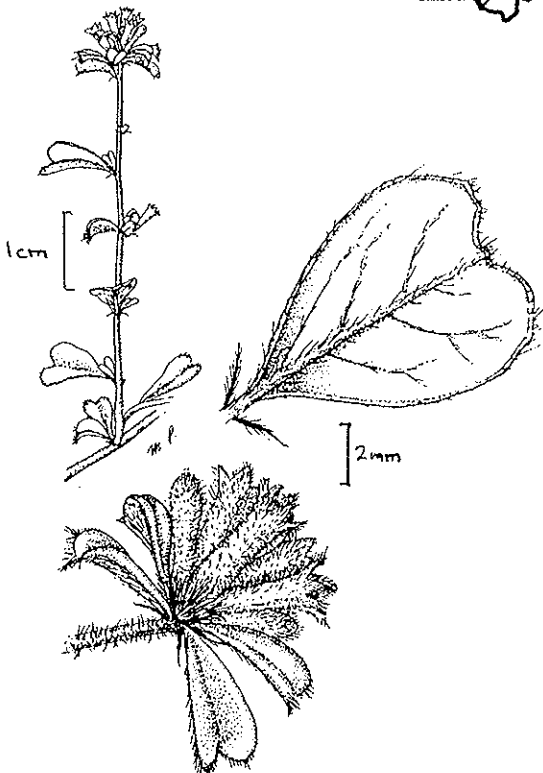
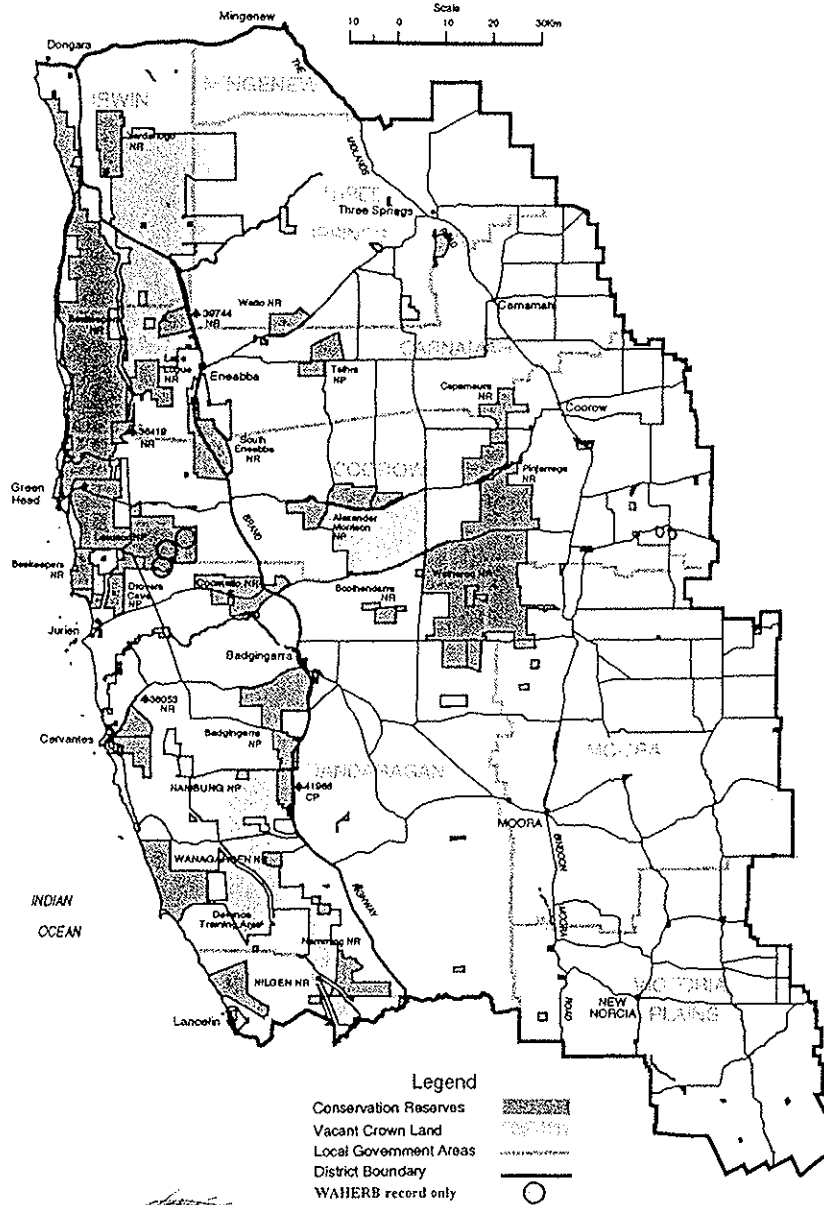
- Ensure that dieback hygiene procedures are carried out at all populations.

### **Research Requirements**

- Further survey is required.

### **References**

Rye (1995).



*Stenanthemum limitatum*

## *Stylidium aconioides* Carlquist

## STYLIDIACEAE

A tufted perennial with flowering stems to 18 cm high, one to several arising from each rosette. The basal rosette of elliptic spatulate leaves is flattened to the soil. The leaves are 3-6 mm broad, about 10 mm long, glabrous, with a transparent fringe along the margins. There are scattered, narrow leaves on the stems alternating annually with zones of small scale leaves which cover the older stems.

The inflorescence is a panicle. The calyx is top-shaped with obtuse lobes. The flowers have four ovate-elliptic lobes, yellow in colour, slightly unequal, the larger ca. 3 mm long, and with six minute throat appendages, two of which may be bifid, so that there appear to be eight. The labellum is minute, triangular in shape. The fruit is a capsule ca. 2 mm long.

**Flowering Period:** September-November

### Distribution and Habitat in the Moora District

Endemic to the Moora District where it occurs from the Lesueur area south to Cataby, a geographic range of ca. 75 km.

Occurs among low heath in sandy pockets or gravelly loam on lateritic slopes of mesas or breakaways, or in shallow white sand over sandstone.

### Conservation Status

Current: Priority 2

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Coomallo	D	Nature Reserve	18.11.1992	5+	Undisturbed
2. SE of Cataby	D	Nature Reserve	25.9.1991	10+	Population partly on firebreak
3. W of Dandaragan	D	Private	25.9.1991	1+	Undisturbed
4.*NW of Dandaragan	D	Shire Road Verge	23.9.1988	-	-
5.*NNW of Mt Lesueur	D	National Park	4.9.1979	-	-
6.*NW of Mt Lesueur	D	National Park	4.9.1979	-	-
7.*W of Badgingarra	D	-	26.10.1967	-	-
8.*Mt Peron	D	National Park	1.10.1957	-	-

### Response to Disturbance

Population 2 occurred partly on a firebreak.

### Susceptibility to *Phytophthora* Dieback

Presumed not susceptible

### Management Requirements

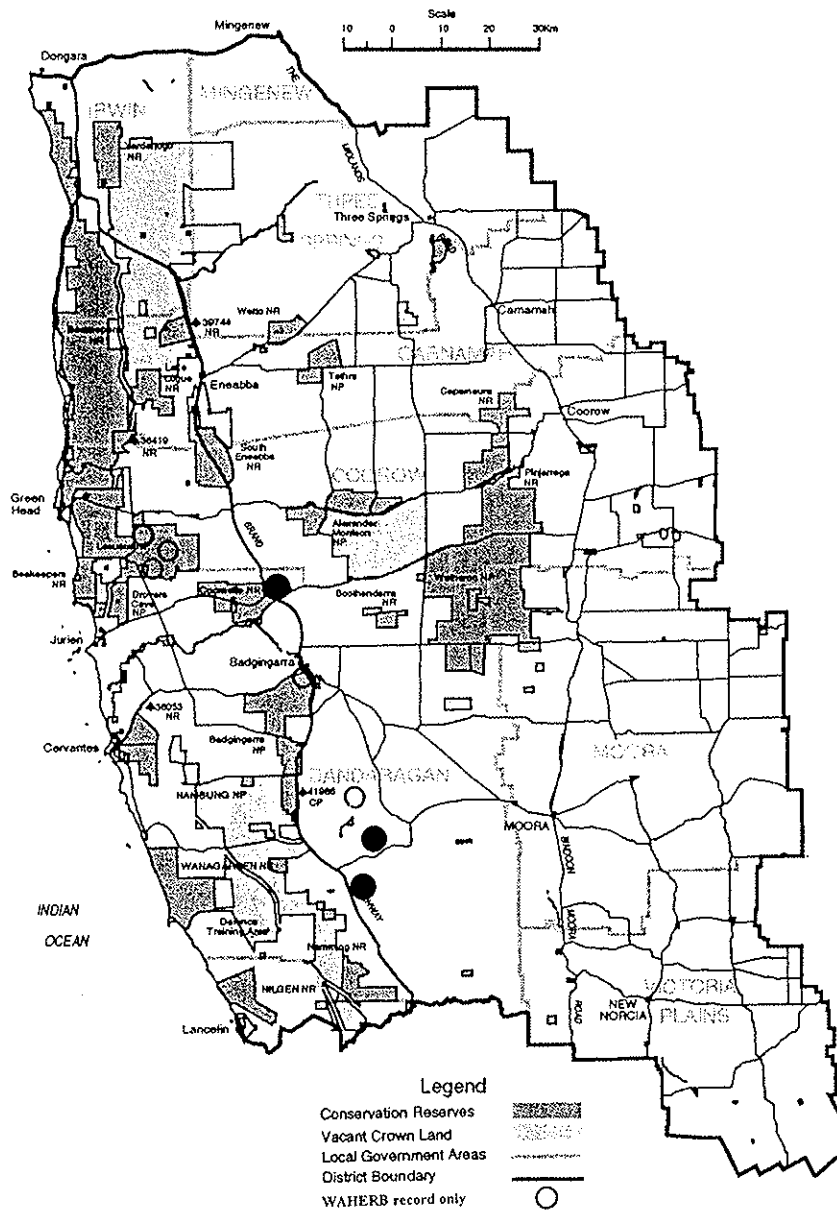
- Maintain liaison with landowner.
- Ensure that dieback hygiene procedures are carried out at all populations.

## Research Requirements

- Further survey is required.

## References

Carlquist (1969), Grieve and Blackall (1982).



● *Styliidium aenioides*

*Stylidium diuroides* Lindl. subsp. *paucifoliatum*  
A.Lowrie & Carlquist

STYLIDIACEAE

Northern Donkey Triggerplant

An erect stilted herb with flowering stems to 30 cm tall. The lower leaves are grass-like, to 4 cm long, forming a basal tuft. There are two whorls of linear, leaf-like bracts on the flowering stem, and a few bracts above them.

The flowers are in a loose raceme. The calyx is shorter than the flower stalk, with five narrow lobes, longer than the tube, hairless except for glandular hairs on the margins. The petals are yellow in colour, each petal rounded-oblong in shape and with a red nerve on the back. They are paired, the lower pair slightly smaller. There are six yellow, linear throat appendages and an oval labellum with a long narrow point. The column is longer than the petals and the anthers are dark. The ovary is densely glandular hairy. The fruit is an ovoid capsule.

Differs from *Stylidium diuroides* subsp. *diuroides* in the sparsely leaved rosette, with smooth leaf surfaces, not minutely papillate, a 2-whorled flower stem, rather than 1-whorled, a terete axis to the flower spike, not angular, glandular margins of the calyx lobes and densely glandular ovaries, not sparsely glandular.

**Flowering Period:** September-November

**Distribution and Habitat in the Moora District**

Occurs in the Moora District over a 100 km range from east of Dongara south to the Lesueur area and eastward for ca. 60 km. There is another early record made in 1905 from further east at Jibberding in the Merredin District. It has also been collected recently from further north of the Moora District and in 1931 from the Mullewa area ca. 70 km further north, in the Geraldton District.

Grows in white or grey sand over laterite, or in sandy loam over sandstone, sometimes at the top of breakaways, in low open heath to 1 m.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. W of Mingenew	I	Rail Reserve	23.9.1990	1000 est.	Good
2. N of Badgingarra	Co	National Park	12.1.1993	Frequent	-
3. N of Mt Lesueur	D	National Park	6.10.1991	10+	Good
4.* S of Eneabba	Ca	?VCL	7.11.1978	-	-
5.* NW of Eneabba	I	?VCL	17.10.1975	-	-
6.* W of Arrino	TS	-	3.10.1973	-	-
7.* Watheroo	Mo	-	4.11.1954	-	-
8.* Cockleshell Gully	D	?National Park	15.10.1946	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed not susceptible



### Management Requirements

- Ensure that dieback hygiene procedures are carried out at all populations.

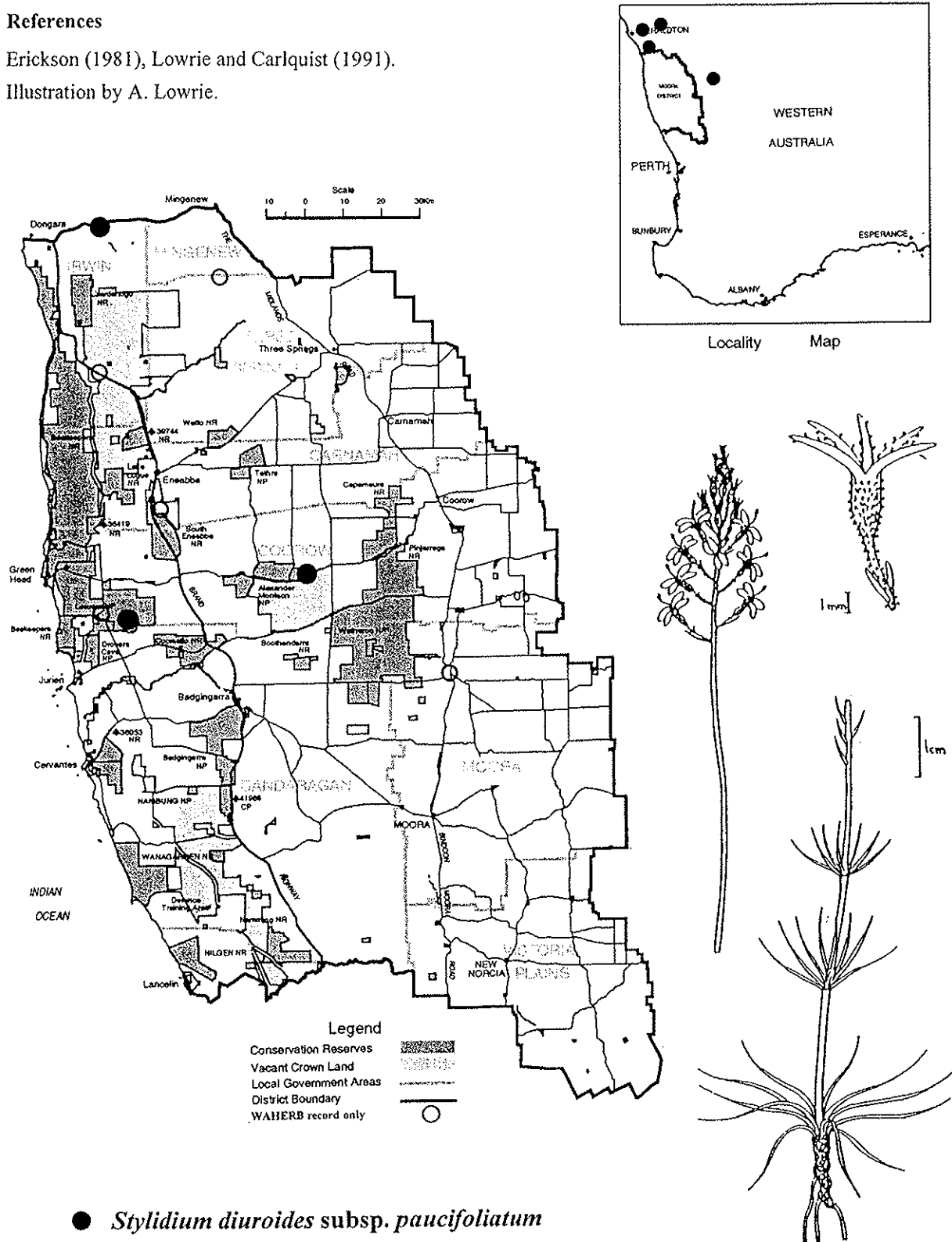
### Research Requirements

- Further survey is required.

### References

Erickson (1981), Lowrie and Carlquist (1991).

Illustration by A. Lowrie.



A glabrous perennial with a shrub-like habit to 45 cm tall, branching from near the base with quadrangular, reddish-brown stems. The leaves are linear, to 40 mm long, arranged in dense whorls along the stems, spaced ca. 6 cm apart. The flowers are in terminal solitary racemes up to 9 cm long. The flowers are borne on stalks to 1.5 cm long with a pair of bracts at the base of each. The calyx lobes are acute, ca. 3 mm long about the same length as the tube. The corolla is pale pink, with a short tube and obovate lobes 7 mm long by 5 mm wide. There are six throat appendages, four are minute and united into pairs, the anterior two are larger. The labellum is ca. 2 mm long, with glandular hairs, and with a pair of filiform basal appendages as long as the labellum. The fruit a capsule ca. 6 mm in diameter.

This species is related to *Stylidium scandens*, which has a more southerly distribution. *S. nonscandens* differs in its quadrangular stems, lack of tendril tips to the leaves and thus a non-climbing habit, narrow acute calyx lobes, pale not deep pink corolla colour, with corolla lobes united for half their length. The throat appendages are much smaller and the labellum has short basal appendages. The vesiculate hairs among the anthers are more conspicuous. The capsules have a crescent-shaped septum, not a globose placenta. It is therefore regarded as a northern variant of *S. scandens*.

**Flowering Period:** September-November

#### Distribution and Habitat in the Moora District

This species is endemic to the Moora District. The main area of occurrence is between Tathra and Alexander Morrison National Parks, extending west to the Lesueur and Coomalloo areas. There is also an earlier record made in 1974 from the south of the District west of Mogumber. This population was not refound during the survey.

Occurs on white sand over laterite, greyish white clayey sand or sandy clay with gravel, sometimes on slopes, in low open heath and open mallee scrub. Associated species include *Eucalyptus drummondii*, *Dryandra* and *Conospermum* species.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Garibaldi-Willis Road	Co	Shire Road Verge, ?Gravel Reserve	5.11.1992	60+	Undisturbed
2. Garibaldi-Willis Road	Co	Shire Road Verge, Shire Gravel Reserve	5.11.1992	6	Undisturbed
3.* Alexander Morrison	Co	National Park	8.1988	Occasional-WH	-
4.* Alexander Morrison	Co	-	12.9.1985	Occasional-WH	-
5.* N of Mt Michaud	D	National Park	12.10.1982	-	-
6.* Alexander Morrison	Co	-	29.9.1979	Common-WH	-
7.* N of Alexander Morrison	TS	Reserve for use and benefit of Aboriginals	22.11.1978	-	-
8.* Coomallo	D	-	9.8.1977	-	-
9.* Red Gully Road	VP/G	-	6.10.1974	-	-

### Response to Disturbance

May be favoured by disturbance. It was noted at a population west of Coorow that the plants were especially abundant on road margins.

### Susceptibility to *Phytophthora* Dieback

Presumed not susceptible

### Management Requirements

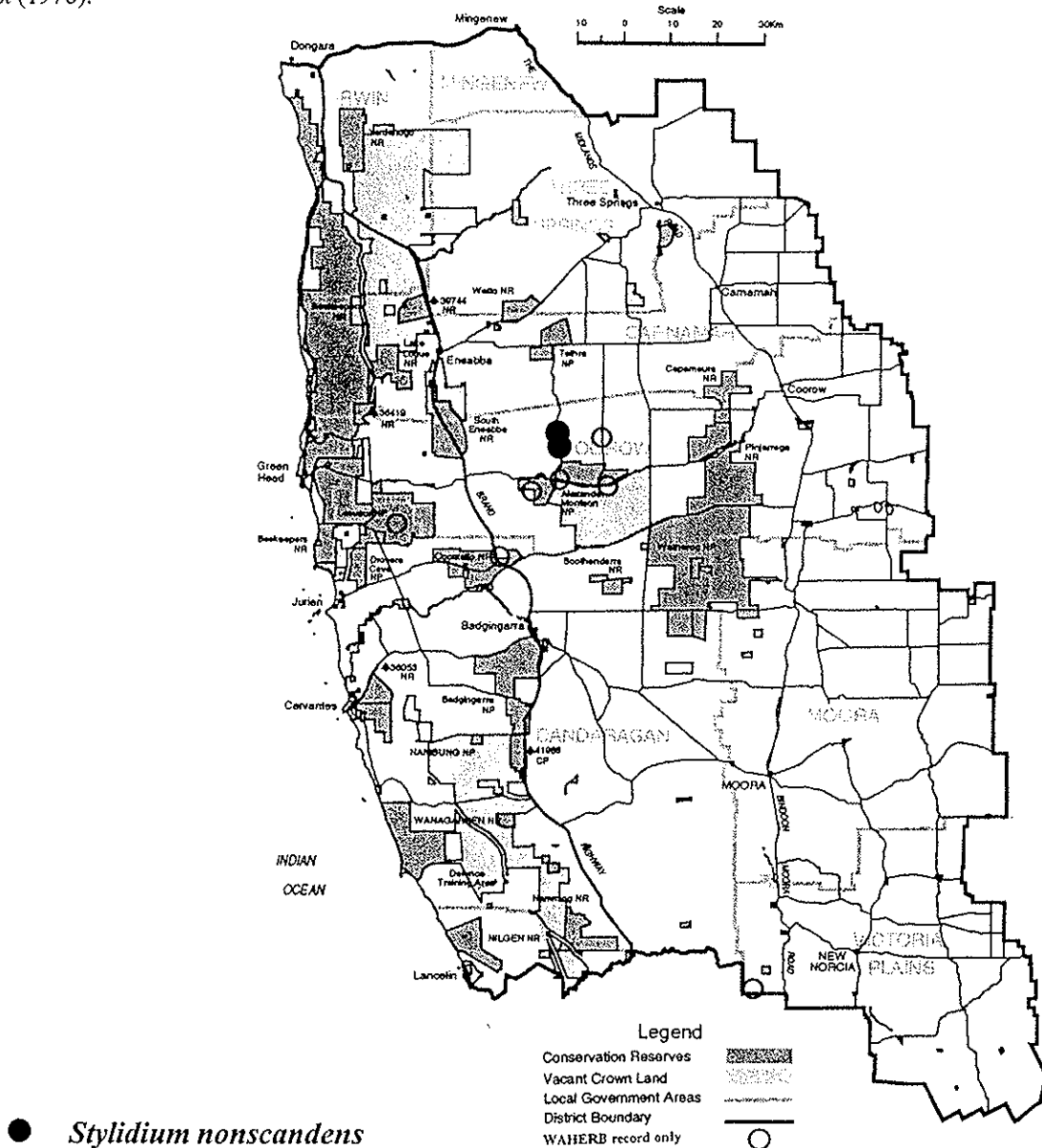
- Ensure that road verge populations are marked.
- Ensure that dieback hygiene procedures are carried out at all populations.

### Research Requirements

- Further survey is required.

### References

Carlquist (1976).



## *Thysanotus* sp. Badgingarra (E.A.Griffin 2511)

## ANTHERICACEAE

An erect perennial to ca. 35 cm tall, with a rhizome and fibrous roots. The leaves are absent and the stems are terete and striate, branching acutely in the upper part. The flowers have six fringed purple tepals. There are six stamens, the three inner anthers are 7 mm long, the three outer anthers are 2.5 mm long.

This species appears to be closely related to *Thysanotus sparteus* but plants in the field were noted to have distinct characters differing from those of that species, including stem width, striations and branching, and there were also differences in the stamens and sheathing bracts.

However, recent taxonomic studies in the genus *Thysanotus* have concluded that *T. sparteus* is an extremely variable species and requires further study before division into subgroups can be made. The characters noted in *T. sp. Badgingarra* (E.A.Griffin 2511) are considered to fall within the variation in *T. sparteus* and it is considered that the taxon does not warrant separation from *T. sparteus* at this stage.

**Flowering Period:** November-December

### Distribution and Habitat in the Moora District

Known from two collections in the Lesueur and Badgingarra areas.

Recorded as growing on grey sand in high shrubland and on dark grey to orange sandy loam with lateritic gravel in low open heath.

### Conservation Status

Current: Priority 2

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.*S of Cockleshell Gully	D	-	10.11.1979	-	-
2.*Badgingarra	D	-	15.12.1976	-	-

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

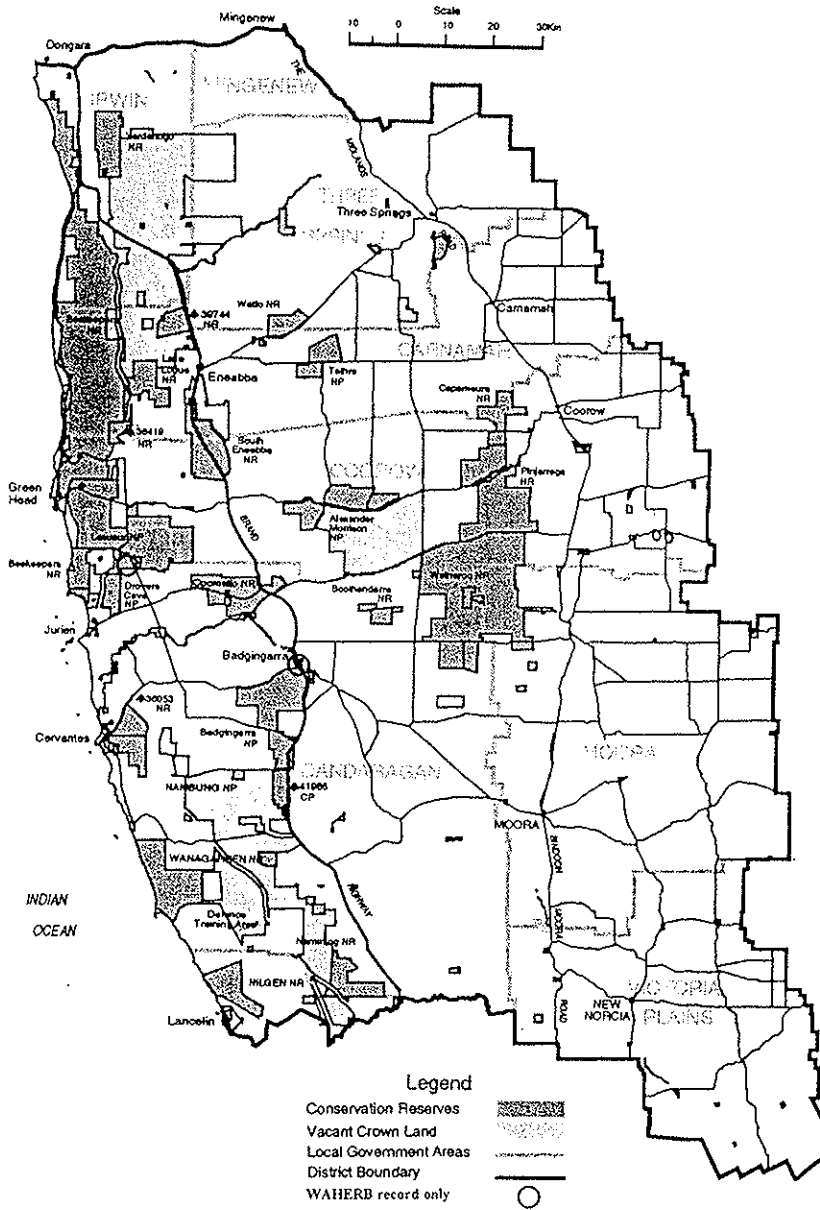
- Ensure that dieback hygiene procedures are carried out at all populations.

### Research Requirements

- Further taxonomic research is required.

### References

E. Griffin (personal communication), H. White (personal communication).



*Thysanotus* sp. Badgingarra (E.A.Griffin 2511)

A semi-prostrate, rhizomatous herb to 85 cm tall. The stems are robust and the lower part of the stem is densely hairy. The leaves are basal and linear, the lower part densely hairy. The flowering stems are terete and branched, with linear bracts. Each branch has a terminal umbel of flowers. These are large, with a yellow perianth, of six free, narrow segments ca. 8 mm long, which become spirally twisted when the flower withers. There are six upright stamens, the filaments ca. 2.5 mm long, attached at the base of the perianth. Each has a tuft of hairs below the anther, which is ca. 1 mm long. The superior ovary is deeply three-lobed with three locules, breaking into three mericarps. The style is filiform, with a simple stigma.

This species differs from others in the genus in its robust habit, large flowers and woolly basal part of the stem.

**Flowering Period:** September-January

#### **Distribution and Habitat in the Moora District**

Has been recorded from near Cataby north to the Arrowsmith area and also further north in the Geraldton District to the north of Northampton.

Occurs on flat land, growing in white sand or sandy clay over clay, grey-yellow sandy gravel on flats or gentle slopes, sometimes on lateritic uplands or on coastal limestone, in low open heath, shrubland, or banksia scrub.

#### **Conservation Status**

Current: Priority 2

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Twyata	D	MRWA Road Verge	6.11.1992	2+	Undisturbed
2. S of Cockleshell Gully	D	National Park	10.12.1992	15	Partly disturbed
3. N of Eneabba	I	-	14.1.1989	Common-WH	Regrowth after fire
4.* NE of Mt Lesueur	D	National Park	3.11.1979	-	-
5.* S of Eneabba	Ca	VCL (Mining Lease)	25.10.1978	-	-
6.* Mimegarra Road	D	-	28.10.1973	Common-WH	-
7.* W of Watheroo	-	-	30.11.1961	-	-

#### **Response to Disturbance**

Regenerates from rootstock after fire.

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

Unknown

#### **Management Requirements**

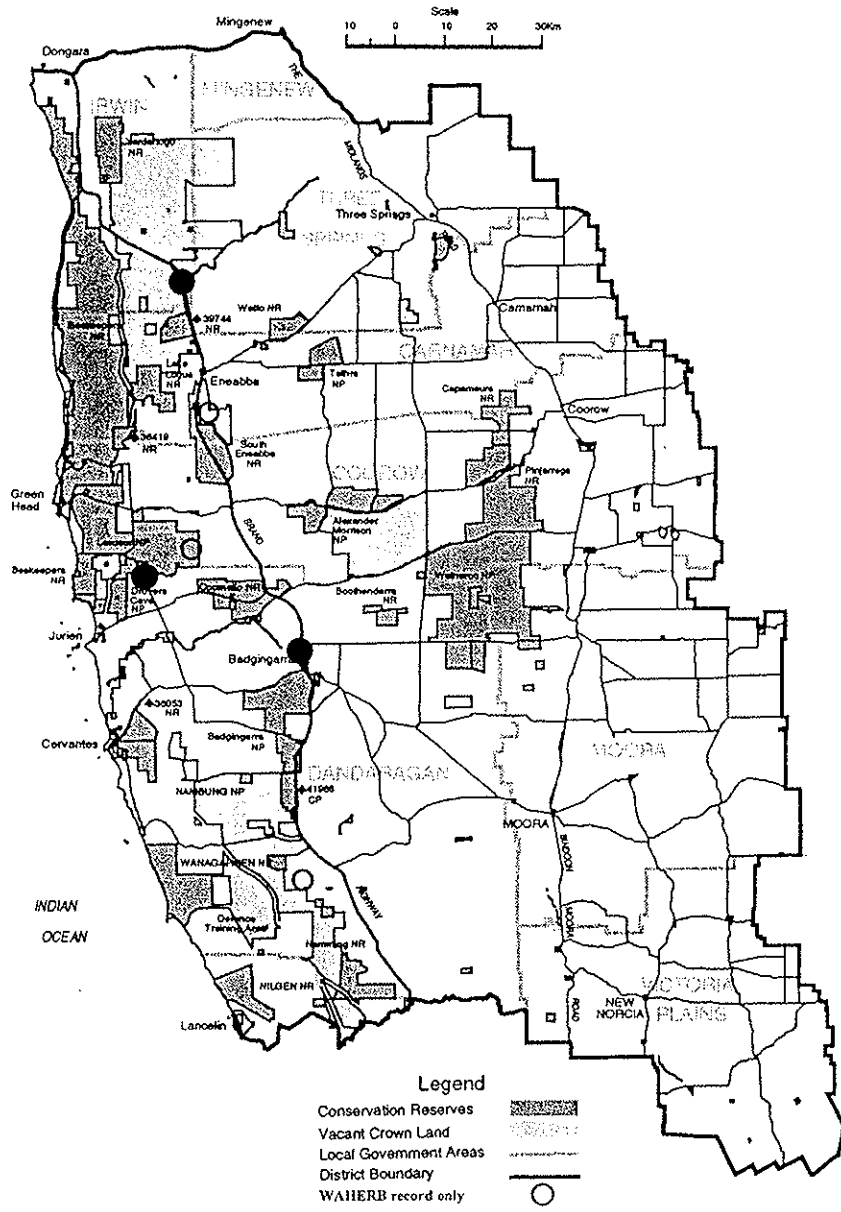
- Ensure that dieback hygiene procedures are carried out at all populations.

#### **Research Requirements**

- Further survey is required.

References

G. Keighery (personal communication), Thongpukdee (1987).



● *Tricoryne robusta ms*

*Triglochin stowardii* N.E.Br.

JUNCAGINACEAE

Stoward's Arrowgrass

An erect hairless, annual herb, 10-17 cm tall. The leaves are terete-filiform, 3-5 cm long and 0.5 mm wide. The flowering stalks are 4-12 cm long, with the flowers in a simple raceme. There are six perianth segments, in two whorls of three, concave and ovate lanceolate in shape, with acute tips. The outer three are 1.5-2 mm long. There are six anthers and the ovary is made up of three carpels. The flowers are green or greenish-yellow in colour.

This species has affinities with *Triglochin calcitrapa* but differs in the stalked fruits which are smaller and narrower.

**Flowering Period:** August-October

**Distribution and Habitat in the Moora District**

Has been recorded from north-east of Watheroo and north of Moora in the Moora District. Also occurs eastwards in the Merredin District and further south in the Narrogin District.

Grows in sand, or loamy sand on winter-wet flats, amongst other herbs.

**Conservation Status**

Current: Priority 2

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* N of Moora	Mo	-	29.9.1966	-	-
2.* NE of Watheroo	Co	Road Verge	29.9.1966	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

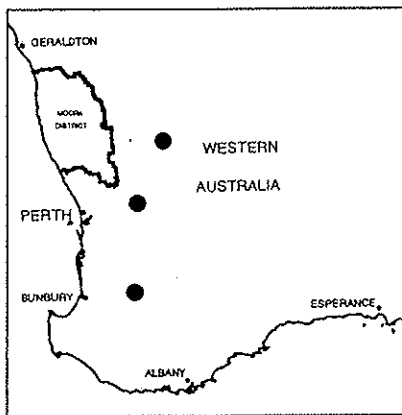
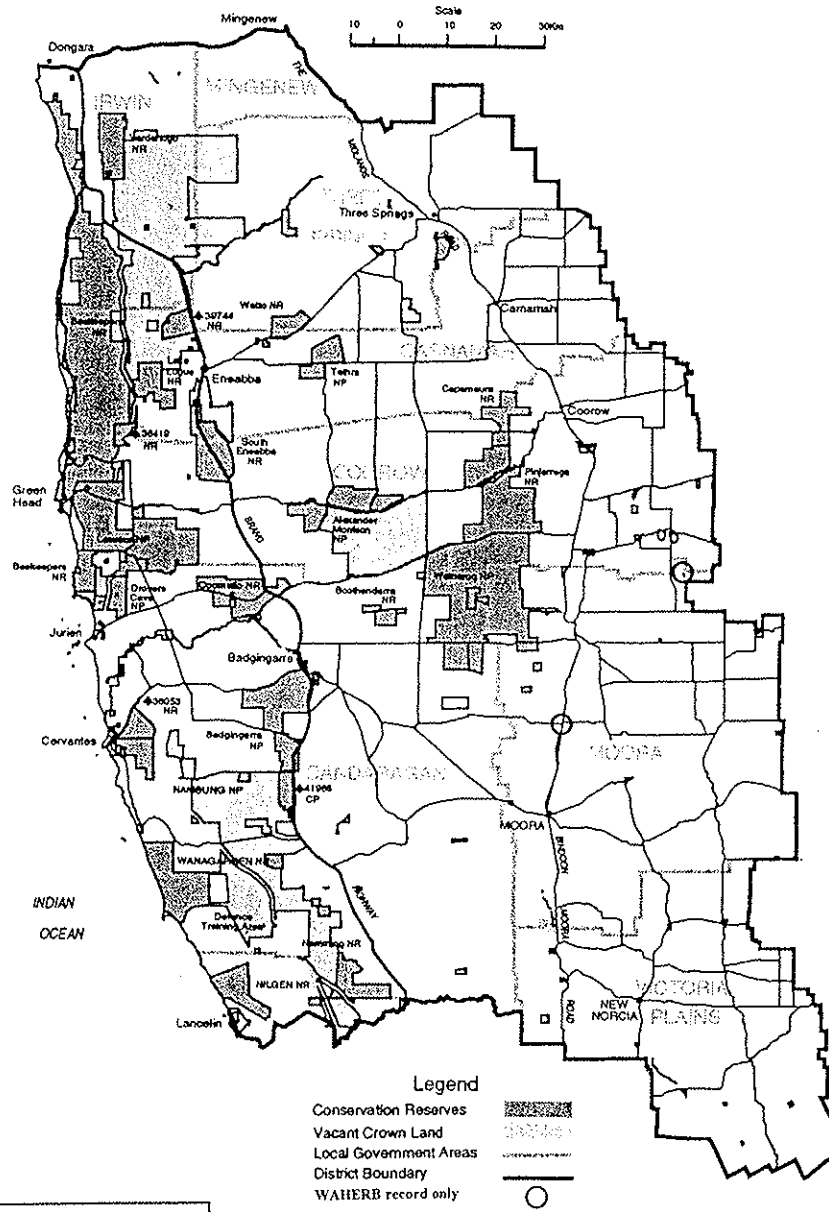
**Research Requirements**

- Further survey is required.

**References**

Blackall and Grieve (1974), Brown (1914), Grieve and Blackall (1982).





Locality Map

● *Triglochis stowardii*

## *Trymalium urceolare* (F.Muell.) Diels

RHAMNACEAE

This species was described in 1904 from a Drummond collection made last century and was also known from specimens collected by Diels from near Toodyay at the turn of the century. It was presumed extinct until refound north of Bindoon in 1986.

*Trymalium urceolare* is an erect shrub to 80 cm tall with ovate leaves to 1.5 cm long, ca. 7 mm wide. They are glabrous above, white woolly beneath. The flowers are cream in colour, in short panicles with a zigzag axis. The panicles are not much longer than the leaves. The calyx is hairless and the five petals are hooded but the small stamens are released as the petals open. The fruit is an urn-shaped capsule ca. 3 mm long with a persistent disc.

**Flowering Period:** August-September

### **Distribution and Habitat in the Moora District**

Occurs on the southern boundary of the Moora District south of Calingiri. The species also occurs further west in the Swan District to the north and north-east of Bindoon.

Grows in brown gravelly loam or in red-brown clay loam in woodland of wandoo and York gum, jarrah or marri over low heath or open low scrub.

### **Conservation Status**

Current: Priority 2

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Calingiri	VP	Shire Road Verge, Public Utility Reserve	9.9.1991	100+	Undisturbed

### **Response to Disturbance**

Unknown

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

Unknown

### **Management Requirements**

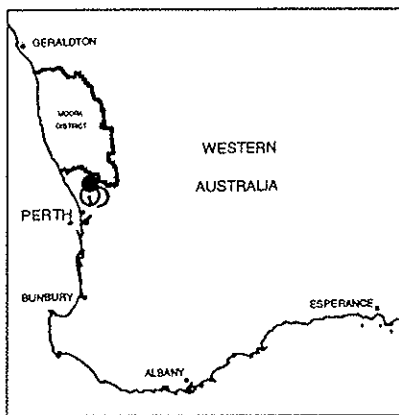
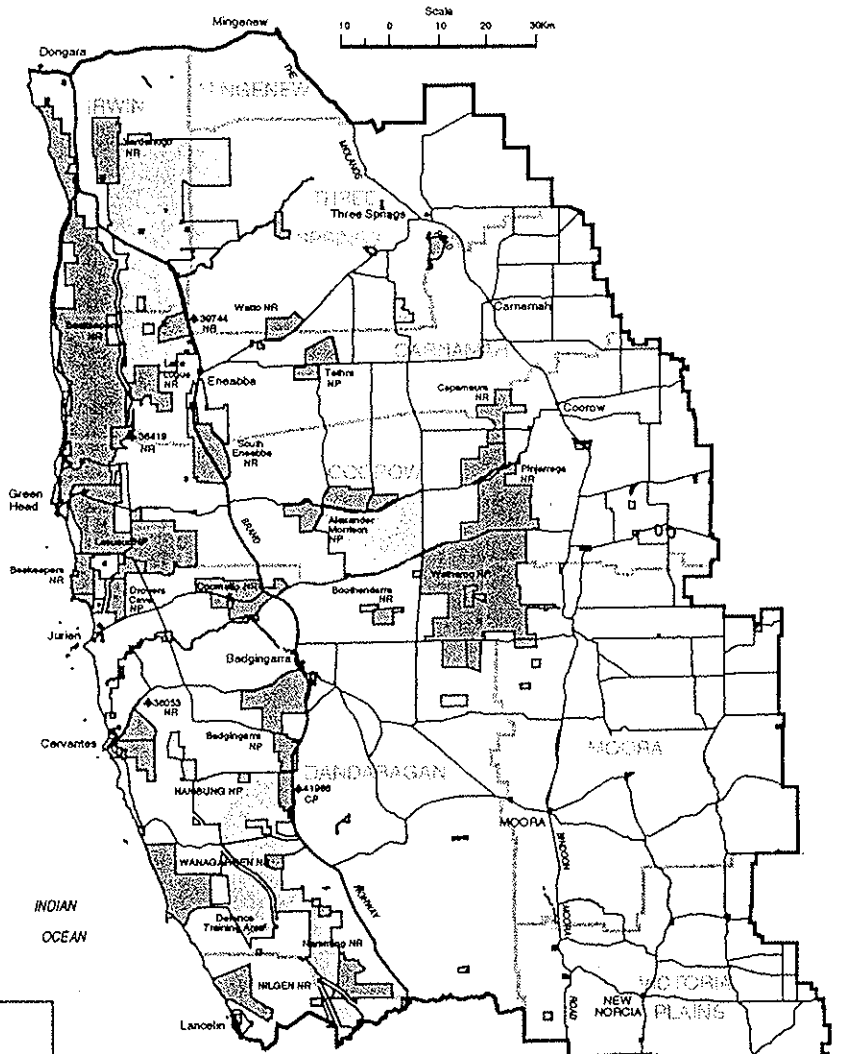
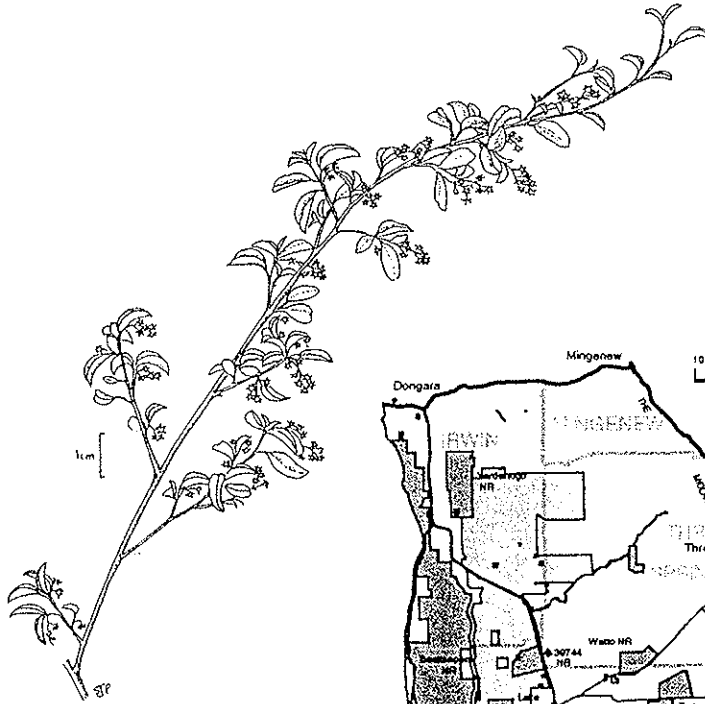
- Ensure that dieback hygiene procedures are carried out at population.

### **Research Requirements**

- Further survey is required, particularly in conservation reserves.

### **References**

Blackall and Grieve (1981), Diels and Pritzel (1904), Leigh *et al.* (1984), Rye (1995).



Locality Map

- Legend
- Conservation Reserves
  - Vacant Crown Land
  - Local Government Areas
  - District Boundary
  - WAHERB record only

● *Trymalium urceolare*

An erect open shrub to 1 m tall, with one basal stem and no lignotuber. The leaves are broad elliptic, 2-5 mm long, edged with prominent cilia which are up to 1 mm long. The flowers are in spike-like groups at the ends of the branches. There are five green reflexed appendages, each ca. 1 mm long on the ribbed hypanthium. The sepals are five to seven-lobed, and fringed, 4-4.6 mm long. The petals are 4-4.5 mm long with a fringe to 1.5 mm long. The flowers are usually pinkish-mauve in colour, sometimes bright pink. The stamens and staminodes are glabrous, the stamens 1 mm long. The style is up to 5 mm long and bearded below the apex.

This species is closely related to *Verticordia pennigera* but differs in its non-lignotuberous habit, the larger hypanthium appendages, the sepals lacking auricles, and ovate petals with slender fringe segments and the shorter stamens.

**Flowering Period:** November-February

#### Distribution and Habitat in the Moora District

Occurs from the Mt Adams area south to the Badgingarra area. A collection made in 1991 from Mimegarra Road south of Badgingarra is a hybrid with *V. lindleyi*.

Grows in white to yellow brown sand or clayey sand and gravel in swampy areas and near drainage lines. Populations are found in open scrub and open shrub mallee with species of *Eucalyptus*, *Banksia*, *Melaleuca*, *Acacia*, *Calothamnus*, *Conospermum* and *Anigozanthos*.

#### Conservation Status

Current: Priority 2

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Badgingarra	Co	Shire Road Verge	4.1.1995	100+	Numerous seedlings on road shoulder
2. S of Cockleshell Gully	D	National Park	10.12.1992	100 est.	Partly disturbed
3. Lake Indoon	Ca	MRWA Road Verge	9.12.1992	200 est.	Recently burnt and disturbed
4. E of Warradarge Hill	C	MRWA Road Verge	10.12.1992	5	Partly disturbed
5. SW of Mt Adams	-	-	30.11.1988	-	-
6. S of Mt Adams	-	-	30.11.1988	-	-

#### Response to Disturbance

Germination of seed is stimulated by soil disturbance. The type locality is in an area that was previously sandmined.

#### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

#### Management Requirements

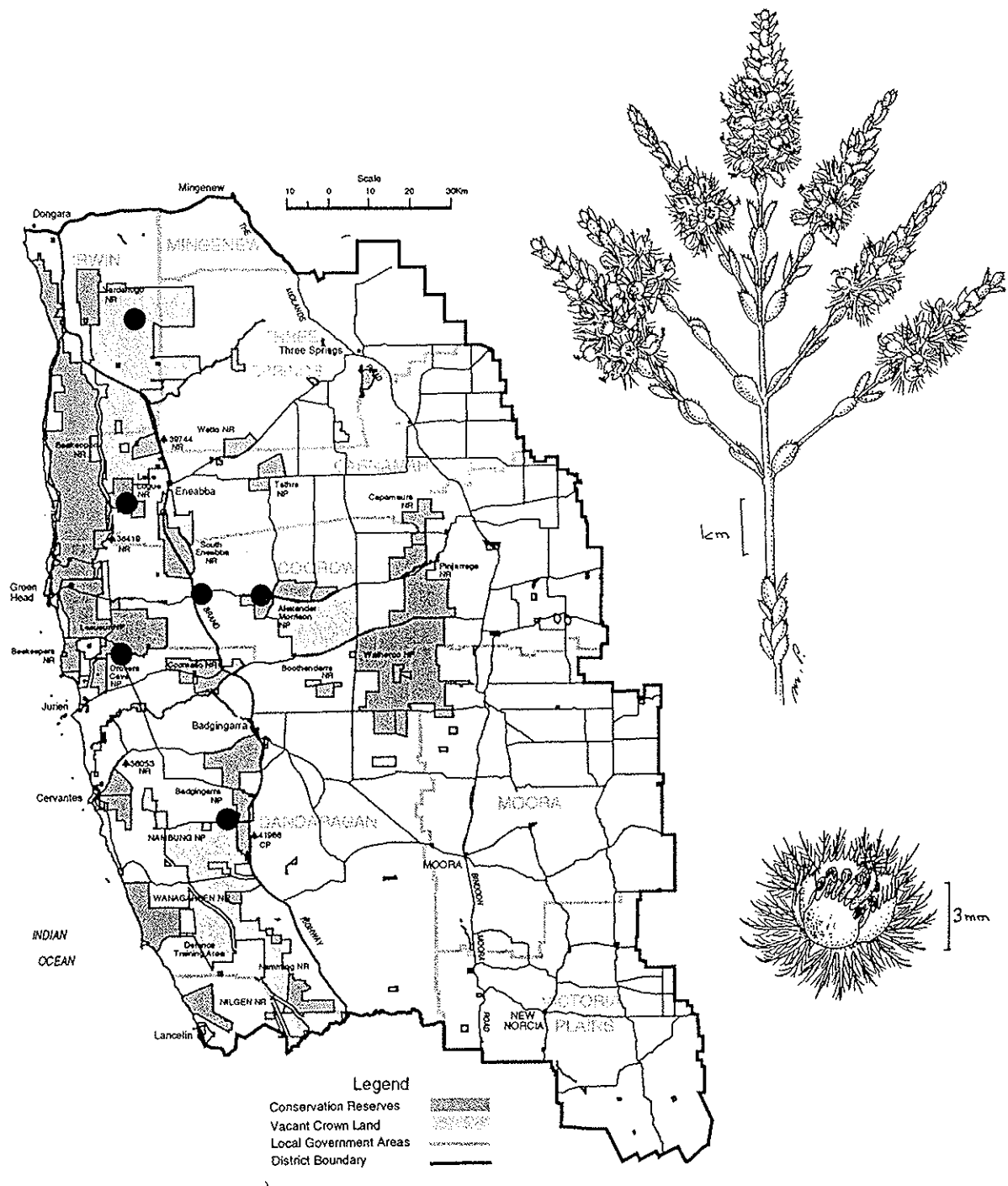
- Ensure that dieback hygiene procedures are carried out at all populations.
- Ensure that road verge populations are marked.

## Research Requirements

- Further survey is required.

## References

George (1991).



● *Verticordia blepharophylla*

## C. Priority Three Taxa

*Acacia aprica* A.R.Chapman & Maslin ms

MIMOSACEAE

A multistemmed shrub to 2 m tall with an open, diffuse habit and smooth, dark grey bark. The branches are flexuose and the phyllodes are terete, 6-14 cm long and 1-1.4 mm wide, curved into an arched shape. There are two inflorescences in each axil, globular to oblongoid in shape, 7-10 mm long, golden in colour. The flowers have their parts in fours. The pods are linear, to 6 cm long, ca. 2 mm wide, with thickened margins. The seeds are oblong, 2-3 mm long, glossy and dark red-brown in colour with a cream aril.

This species has been confused with *Acacia merinthophora* in the past which it resembles in habit.

It is related to *A. filifolia* and *A. alocophylla* subsp. *alocophylla*.

**Flowering Period:** June-August

### Distribution and Habitat in the Moora District

Occurs over a range of less than 10 km between Carnamah and Coorow, where it grows in gravelly brown sand or loam, in heath.

### Conservation Status

Current: Priority 3<sup>#</sup>

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* N of Coorow	Co	MRWA Road Verge	13.6.1982	Fairly uncommon- WH	On disturbed road verge
2.* N of Coorow	Co	-	18.8.1973	-	-
3.* Between Coorow and Winchester	Co	-	1.7.1973	-	-
4.* W of Coorow	Co	?Townsite Reserve	30.6.1967	-	-

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

- Ensure that dieback hygiene procedures are carried out at all populations.
- Collect seed for storage according to the protocols of the Threatened Flora Seed Centre at the Western Australian Herbarium.

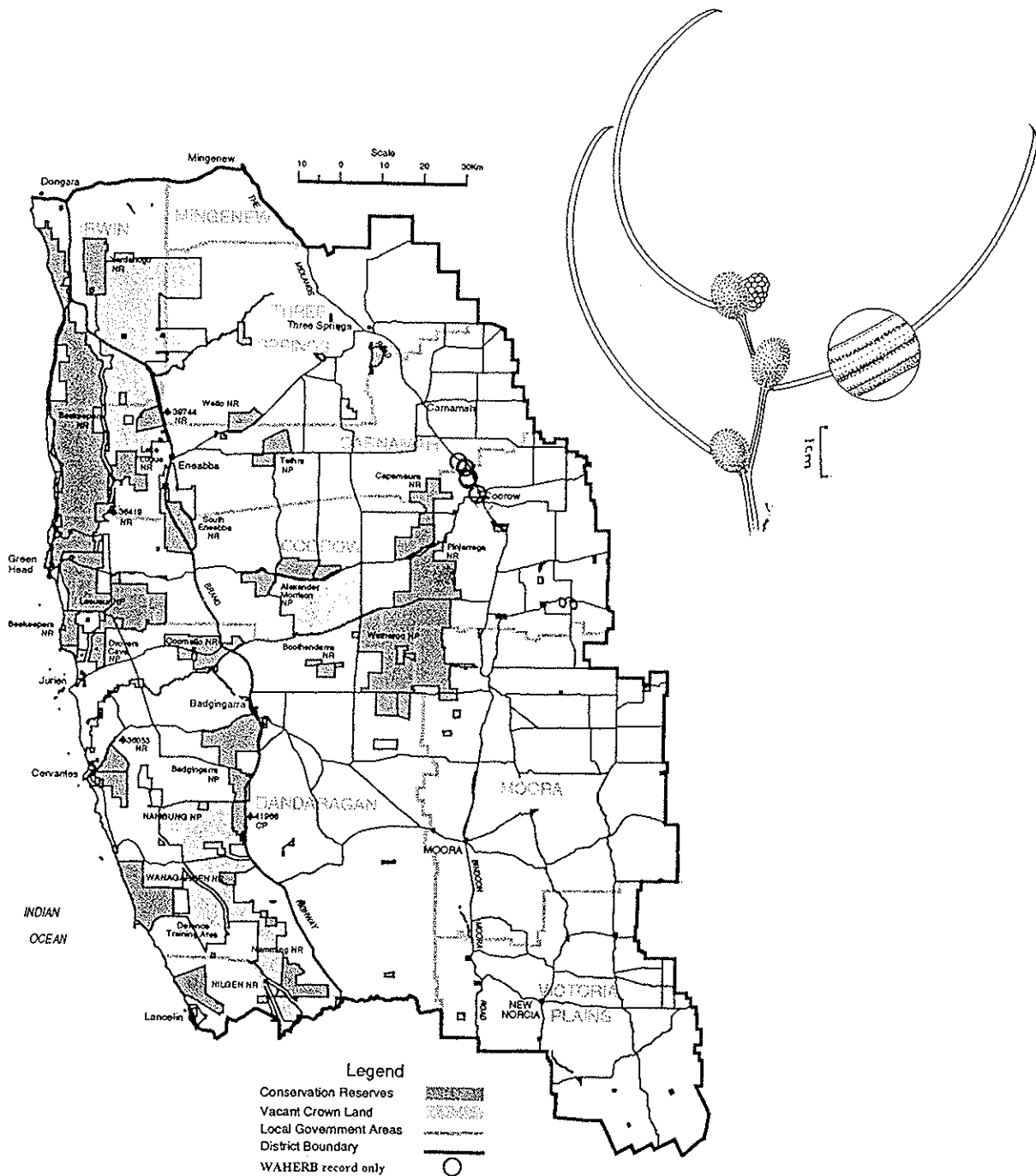
<sup>#</sup> now Declared Rare Flora (updated at December 1999)

## Research Requirements

- Further survey is urgently required, particularly around Lake Pinjarrega. This species was added to the Priority Flora List recently and no search was made during this survey.

## References

B. Maslin (personal communication).



● *Acacia aprica* ms

## *Acacia cummingiana* Maslin

MIMOSACEAE

A sprawling subshrub to 0.4 m tall, with wiry, leafless stems to 1 m long, which grow entangled in the associated vegetation. They are terete, green with yellow ribs, and are straight or shallowly curved. The phyllodes are reduced to thin flattened scales 1.5-4 mm long. The peduncles are glabrous and the flower heads are globular, golden in colour, ca. 8 mm in diameter, with 8-12 flowers, which have their parts in fours. The pods are 4-7 cm long, 8-10 mm wide, with chestnut brown seeds.

This species has been confused in the past with *Acacia volubilis* which has tortuous branchlets, pubescent peduncles and flowers with their parts in fives. It is also similar to *A. carens* if the peduncles are short but the latter differs in the pubescent peduncles, flower parts in fives, and characters of the pods.

**Flowering Period:** May-June, August

### **Distribution and Habitat in the Moora District**

Occurs in the area between Watheroo, Badgingarra, Dandaragan and Moora. Has also been collected from south of the District from west of Wannamal.

Grows in sand or lateritic gravel in heath or low open woodland of *Banksia prionotes* and *Eucalyptus tottiana* over heath.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* W of Moora	Mo	Private	13.9.1988	-	-
2.* SW of Moora	Mo	-	8.6.1984	-	-
3.* E of Dinner Hill	D	-	1.8.1987	-	-
4.* W of Moora	D	-	14.6.1971	-	-
5.* NE of Dandaragan	D	-	24.5.1979	-	-
6. W of Watheroo	-	National Park	6.10.1971	-	-

### **Response to Disturbance**

Unknown

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

Unknown

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

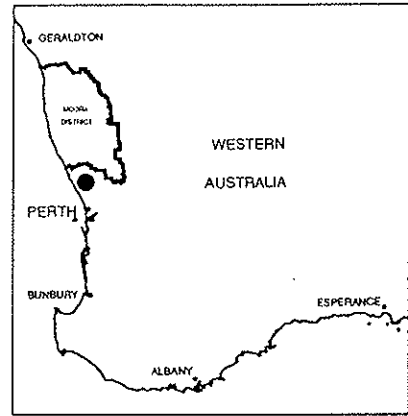
### **Research Requirements**

- Further survey is required.

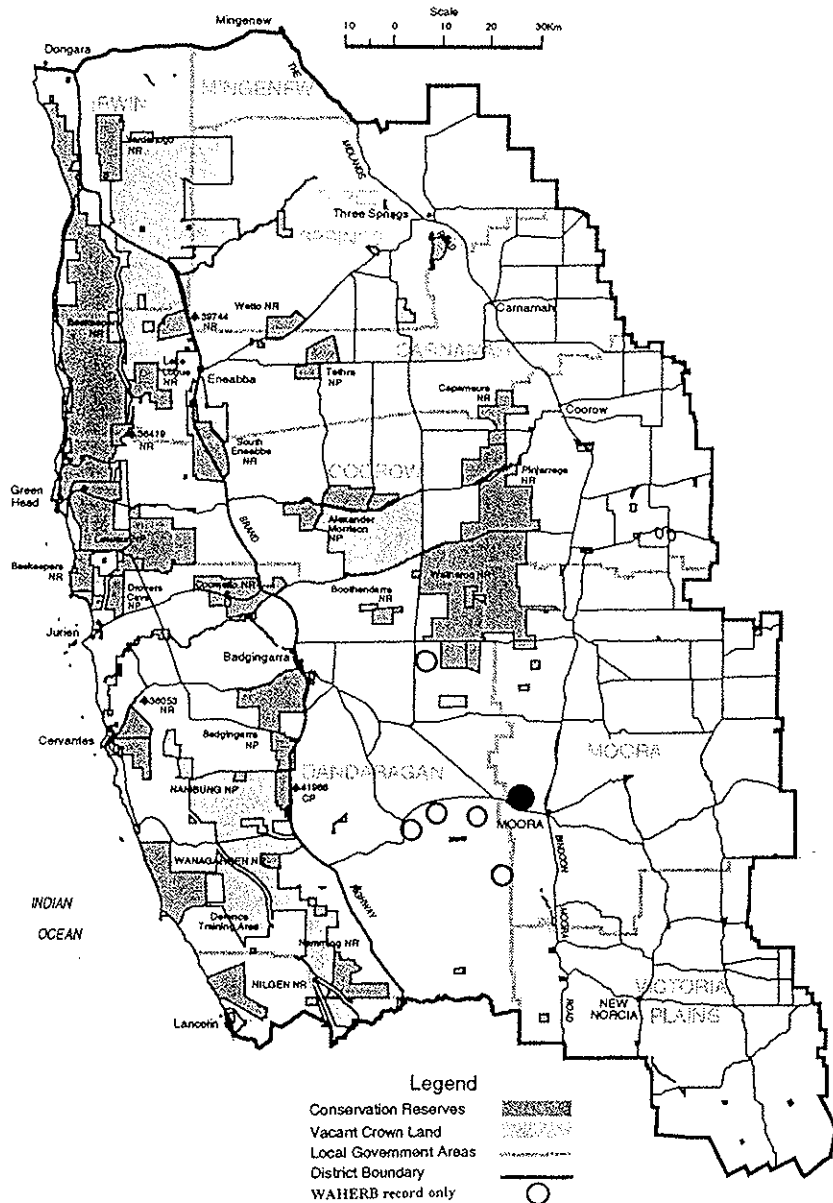
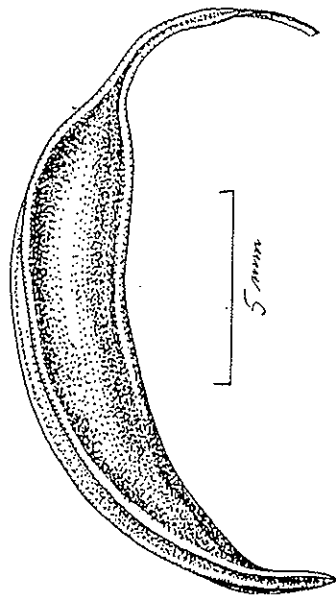
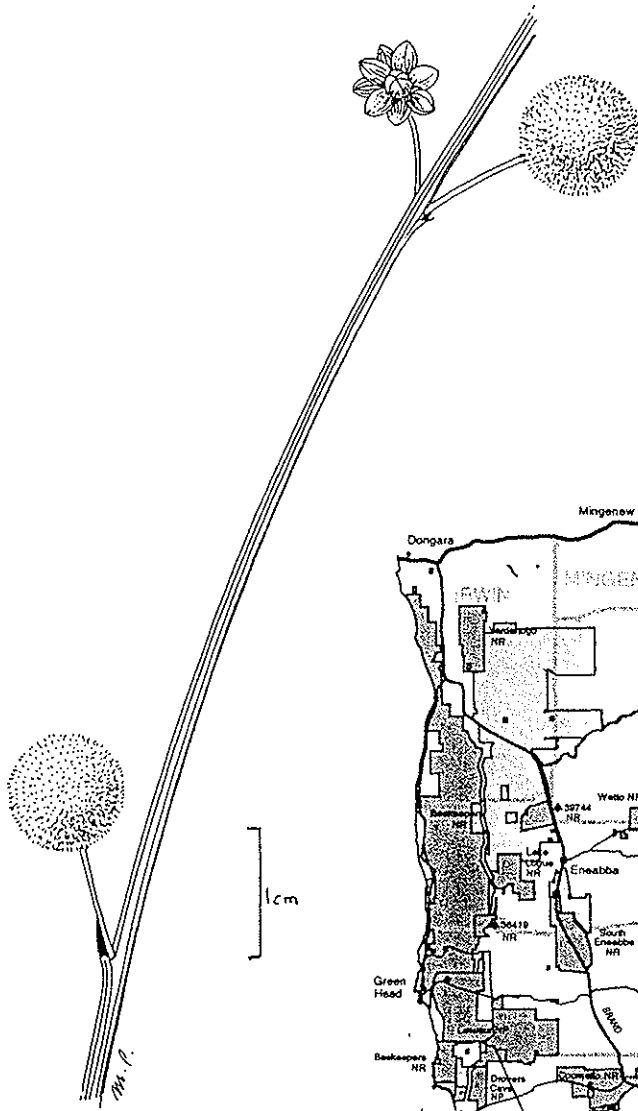
### **References**

Maslin (1995).





Locality Map



● *Acacia cummingiana*

## *Acacia epacantha* (Maslin) Maslin

MIMOSACEAE

A dense, rounded shrub 30-70 cm tall and to 150 cm in diameter. The branches have a covering of soft to stiff short hairs. Axillary spines are present, which are 10-12 mm long. The leaves have two pairs of pinnules which are revolute, 6-10 mm long, the pinna rachis is 1-2 mm long, with an acute dark brown apex, 0.5-1.5 mm long. The peduncles are 7-8 mm long, with stiff hairs. The flower heads are bright yellow and globular in shape. The legumes are shortly-hairy, curved or coiled, 15-40 mm long, 5-7 mm broad and the seeds are mottled.

This species was originally described as *Acacia lasiocarpa* var. *epacantha*. It is distinguished from *A. lasiocarpa* by several characters, those of the leaves and also the inflorescences, which are simple, not a reduced raceme, and they are borne on the solitary axillary spines, not at the base. The legumes are slightly broader, and are curved or coiled, not flat or undulate.

**Flowering Period:** August

### **Distribution and Habitat in the Moora District**

Occurs between Dandaragan and Eneabba, where it occurs in grey sand over laterite, clay loam or loamy gravel in low open heath, sometimes in open wandoo woodland, along creeks or on uplands or breakaways.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. WNW of Dandaragan	D	-	21.8.1990	-	"very disturbed"
2. NW of Dandaragan	D	-	11.8.1988	-	-
3.*NW of Dandaragan	D	-	16.5.1985	-	-
4.*SE of Eneabba	Ca	Govt. Requirements Reserve	20.5.1981	Occasional-WH	-
5.*S of Mt Lesueur	D	-	5.12.1979	-	-
6.*S of Badgingarra	D	-	24.11.1976	-	-
7.*N of Badgingarra	D	-	2.11.1965	-	-

### **Response to Disturbance**

Unknown

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

Unknown

### **Management Requirements**

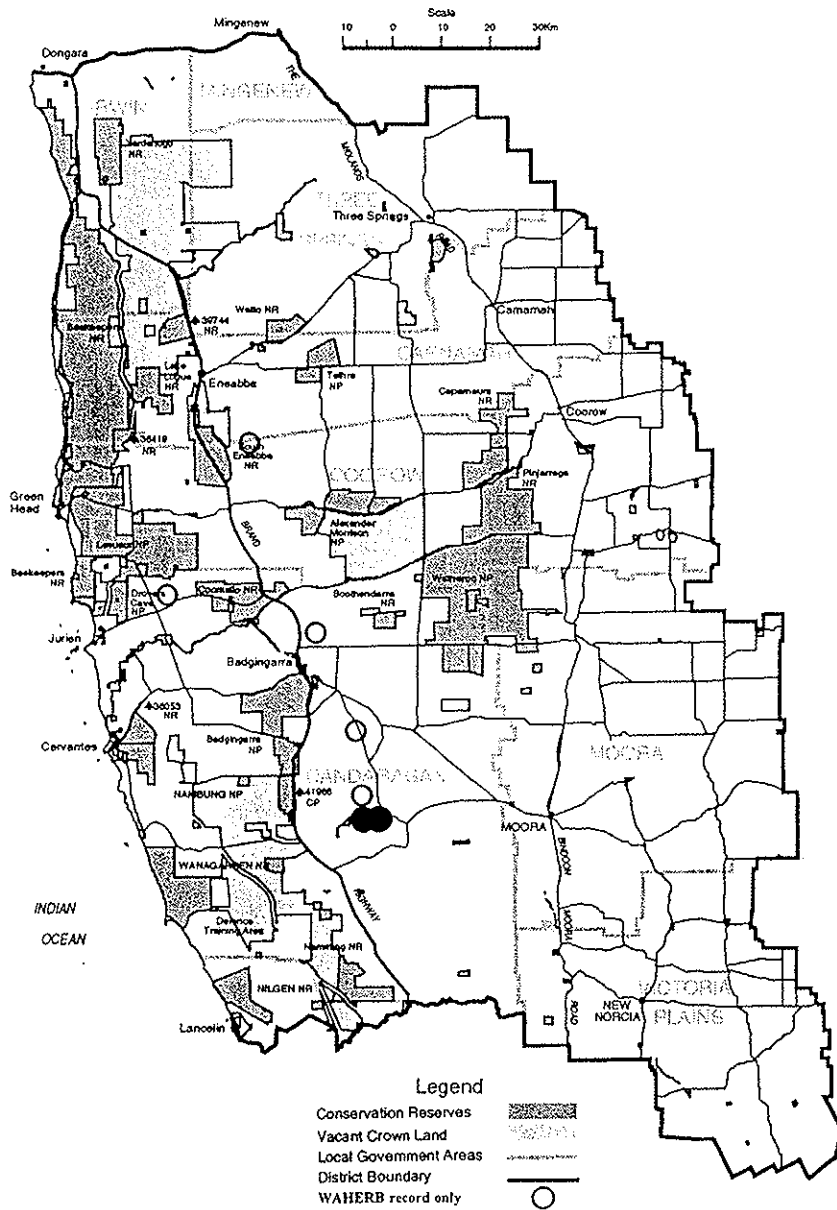
- Ensure that dieback hygiene procedures are carried out at all populations.

### **Research Requirements**

- Further survey is required.

### **References**

Maslin (1975, 1979).



● *Acacia epacantha*

## *Acacia inophloia* Maiden & Blakely

MIMOSACEAE

Fibre-barked Wattle

An erect shrub or small tree 2-4 m tall, much-branched from near the base, with straight, slender branches. The bark is dense and fibrous, stripping in long, linear strips, grey on the outer layers, red-brown underneath. The phyllodes are terete and narrow, 6-11 cm long and ca. 1 mm broad, with short, silky hairs. The flower spikes are sessile, ovoid to cylindrical in shape, 1 cm long, light yellow in colour. The legumes are ca. 7 cm long and 4 mm wide, with a dense covering of short, soft hairs.

**Flowering Period:** August

### **Distribution and Habitat in the Moora District**

Known only from three populations in the Narrogin District, north of Corrigin, north of Kondinin, and near Pederah, with a single collection made from Moora in 1965.

In the Narrogin District the species grows in sand, sandy loam or gravel, sometimes near granite. No details of the habitat were recorded with the collection made at Moora.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.*Moora	Mo	-	18.8.1965	-	-

### **Response to Disturbance**

A population north of Kondinin was recorded as regrowth on a roadside.

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

Unknown

### **Management Requirements**

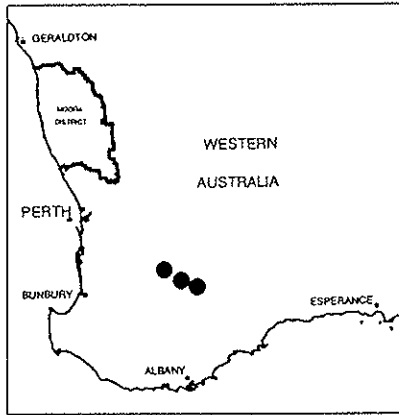
- Ensure that dieback hygiene procedures are carried out at population.

### **Research Requirements**

- Further survey is required.

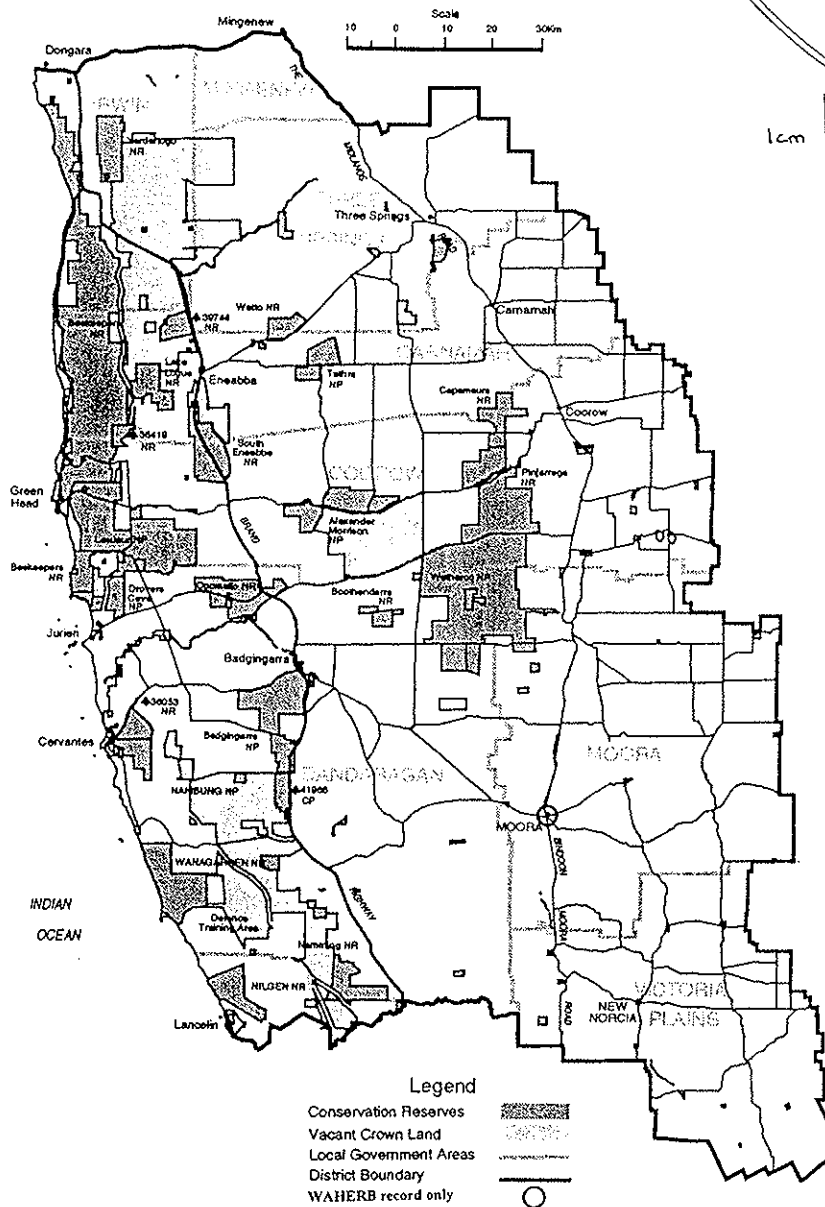
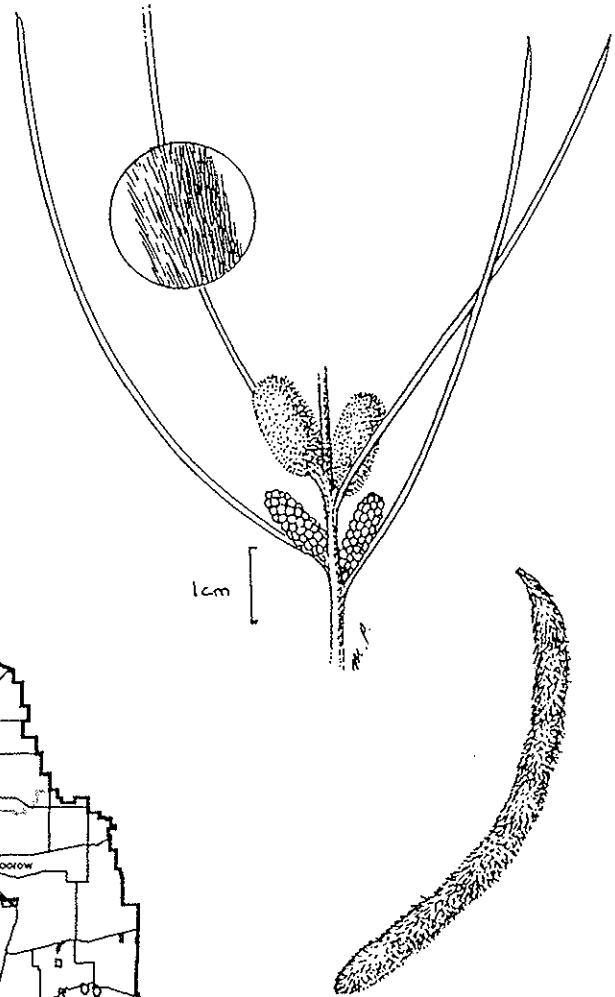
### **References**

Maiden and Blakely (1928).



Locality Map

● *Acacia inophloia*



Legend

- Conservation Reserves
- Vacant Crown Land
- Local Government Areas
- District Boundary
- WAHERB record only

An erect, multistemmed shrub to 3 m tall, with smooth, dark grey bark, fibrous at the base and with erect, red-brown branchlets. The erect phyllodes are terete, 8-nerved and 8-14 cm long and 0.5-1 mm wide. There is a single gland, 2-3 mm above the base. The inflorescence is axillary, with two or three cylindrical, golden heads, 10-15 mm long. The flowers have their parts in fours. The legumes are straight, 5-9 cm long, 2-3 mm wide, constricted between the seeds. The seeds are shiny, brown in colour with grey mottling and a creamy-yellow persistent aril.

Differs from subspecies *nimia* in the 8-nerved phyllode, not 10-nerved, and in the single gland, less than 5 mm above the pulvinus on the phyllode, and in the persistent aril.

**Flowering Period:** August-October

#### **Distribution and Habitat in the Moora District**

Occurs from the Dongara-Mingenew area south-east to near Three Springs. A coarse-phylloded variant occurs to the south-east between Perenjori and Wubin in the Geraldton District.

Grows on yellow, white or brown sand in mixed shrubland.

#### **Conservation Status**

Current: Priority 3

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. W of Mingeneu	Mi	MRWA Road Verge	13.12.1989	-	-
2.* W of Mingeneu	I	-	31.8.1973	-	-
3.* Mingeneu	Mi	-	28.8.1970	-	-
4.* W of Three Springs	TS	-	28.8.1972	-	-
5.* E of Mingeneu	Mi	-	9.8.1970	-	-

#### **Response to Disturbance**

Unknown

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

Unknown

#### **Management Requirements**

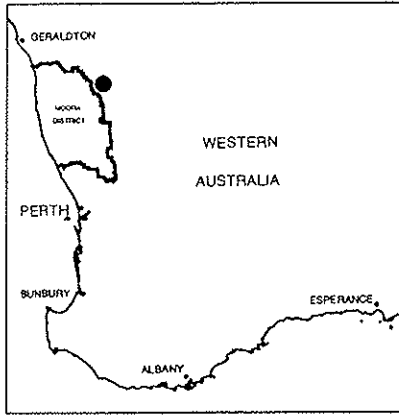
- Ensure that dieback hygiene procedures are carried out at all populations.

#### **Research Requirements**

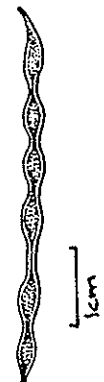
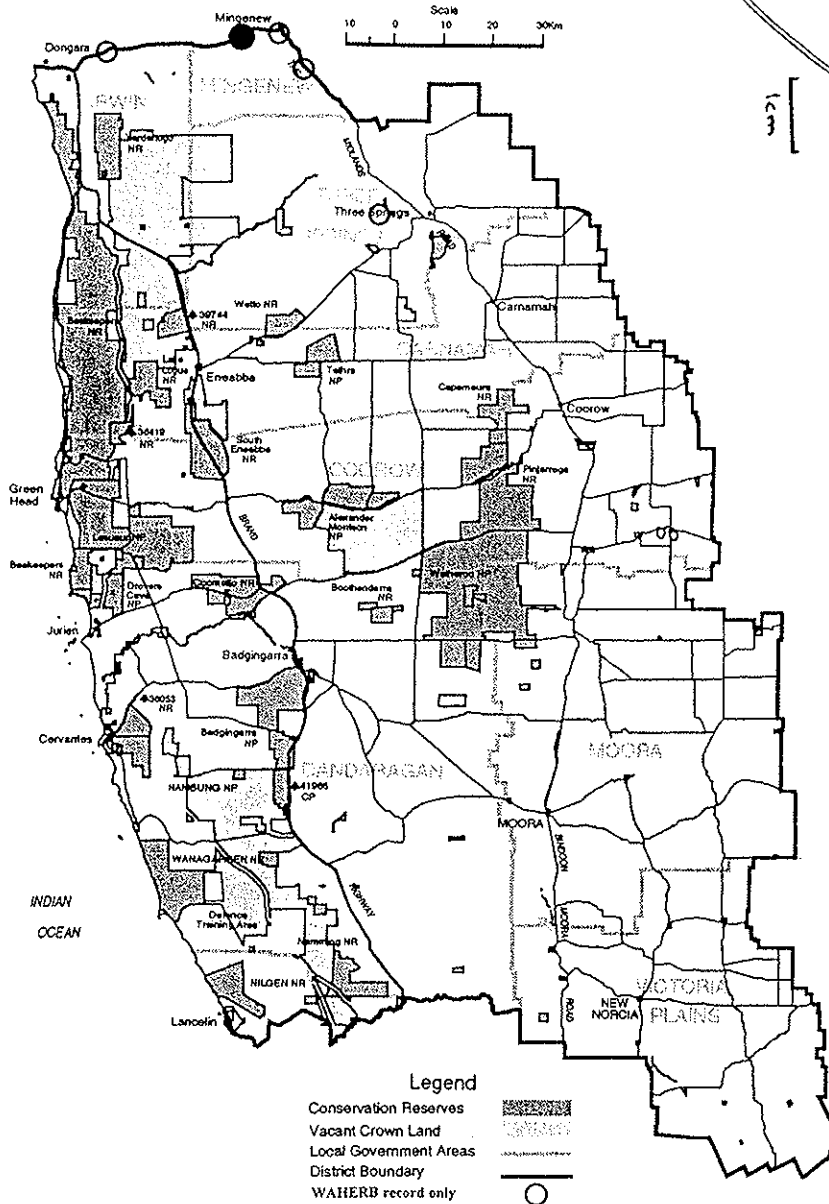
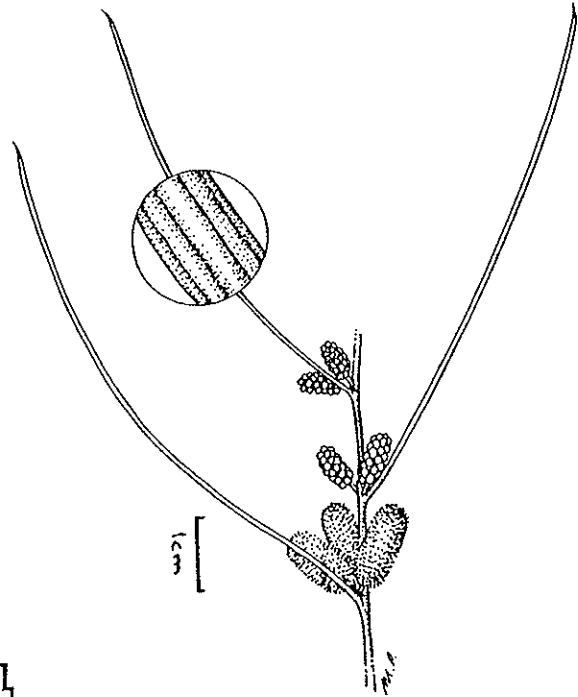
- Further survey is required, particularly on conservation reserves.

#### **References**

B. Maslin (personal communication).



Locality Map



● *Acacia isoneura* subsp. *isoneura* ms

*Acacia isoneura* A.R.Chapman & Maslin  
subsp. *nimia* A.R.Chapman & Maslin ms

MIMOSACEAE

An erect shrub to 3 m tall, with terete phyllodes, 6-14 cm long, 0.7-1 mm wide with ten nerves. There are two glands, the lower 16-60 mm above the base. The flower spikes are axillary, solitary or two per axil, golden in colour. The flowers have their parts in fours. The legumes are straight, 5-9 cm long, 2-3 mm wide, constricted between the seeds. The seeds are shiny, brown in colour with a creamy-yellow aril which is not persistent.

Differs from subsp. *isoneura* in the 10-nerved phyllodes, not 8-nerved, the presence of two glands on the phyllode, not one, and in the aril, which is not persistent, but detaches readily.

**Flowering Period:** July-August

**Distribution and Habitat in the Moora District**

There are two variants of this subspecies. The southern variant occurs in the Moora District between Coorow and Watheroo. The typical variant occurs in the Geraldton District and Midwest Region from Billabong south to near the Murchison River.

Grows in red, yellow or orange-brown sand in open to dense scrub or tall shrubland.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* N of Watheroo	Mo	-	29. 8.1982	-	-
2.* S of Coorow	Co	-	24.7.1979	-	-
3.* S of Coorow	Co	-	25.7.1979	-	-
4.* Coorow	Co	-	8.1980	-	-
5. SE of Coorow	Co	-	13.11.1987	-	-
6.* Winchester	Ca	-	19.8.1972	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

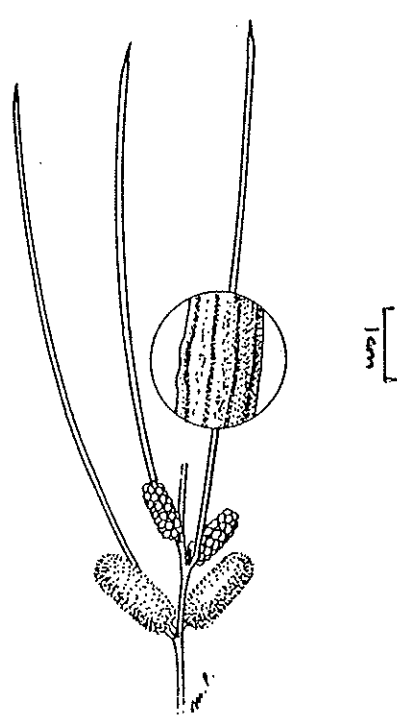
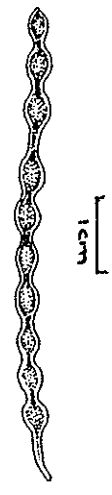
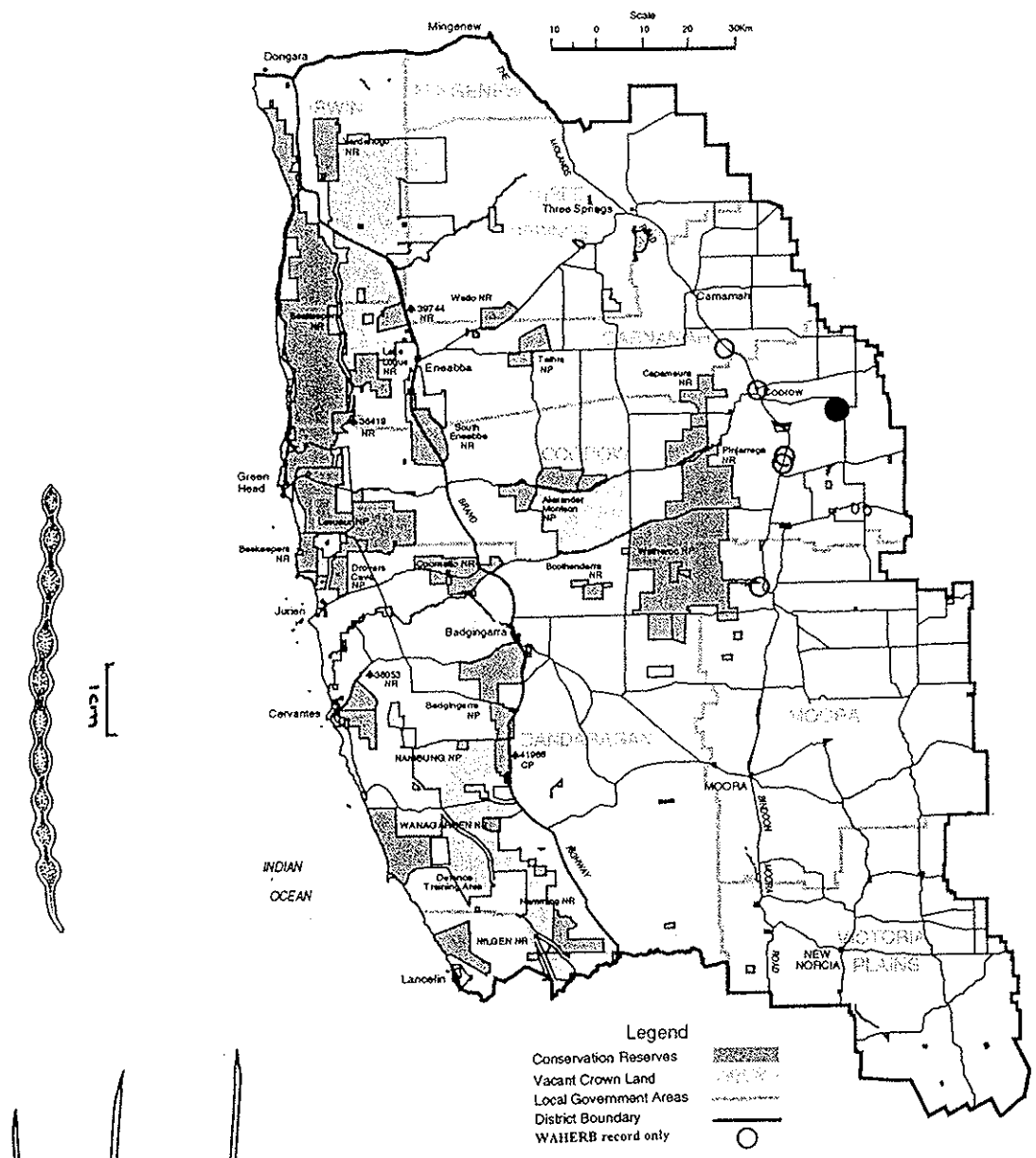
**Research Requirements**

- Further survey is required.

**References**

B. Maslin (personal communication).





● *Acacia isoneura* subsp. *nimia* ms

## *Acacia ridleyana* W.Fitzg.

## MIMOSACEAE

A spreading shrub, 0.3-1 m tall and to 1.5 m in diameter. The younger branches and phyllodes have spreading white hairs. The phyllodes are flat, tapering to the base, usually with a hooked pungent tip, and with three longitudinal nerves. They are up to 2 cm long and ca. 2 mm broad. The inflorescences are globular, light golden in colour, on peduncles ca. 1.5 cm long. The flowers have their parts in fives. The pods are narrowly cylindrical, ca. 3 cm long, covered with a felty coat of hairs, and not constricted between the seeds, which are brown with darker mottling and which have a pale aril.

**Flowering Period:** August-September, December-January, March

### **Distribution and Habitat in the Moora District**

Occurs around Mogumber over a range of ca. 15 km in the Moora District and from the Murchison River south to the Northampton area in the Geraldton District.

Grows in clay, gravelly clay, grey sand, sand over clay or granite loam in the Mogumber area, in heathland.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* Mogumber	VP	-	1.12.1983	-	-
2.* Gillingarra	VP	-	11.6.1982	-	-
3.* N of Mogumber	VP	-	15.12.1981	Common-WH	-
4.* N of Mogumber	VP	-	12.8.1976	-	-
5.* S of Mogumber	VP	-	14.12.1978	-	-
6.* Babilion Hills	VP	-	31.8.1901	-	-

### **Response to Disturbance**

Unknown

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

Unknown

### **Management Requirements**

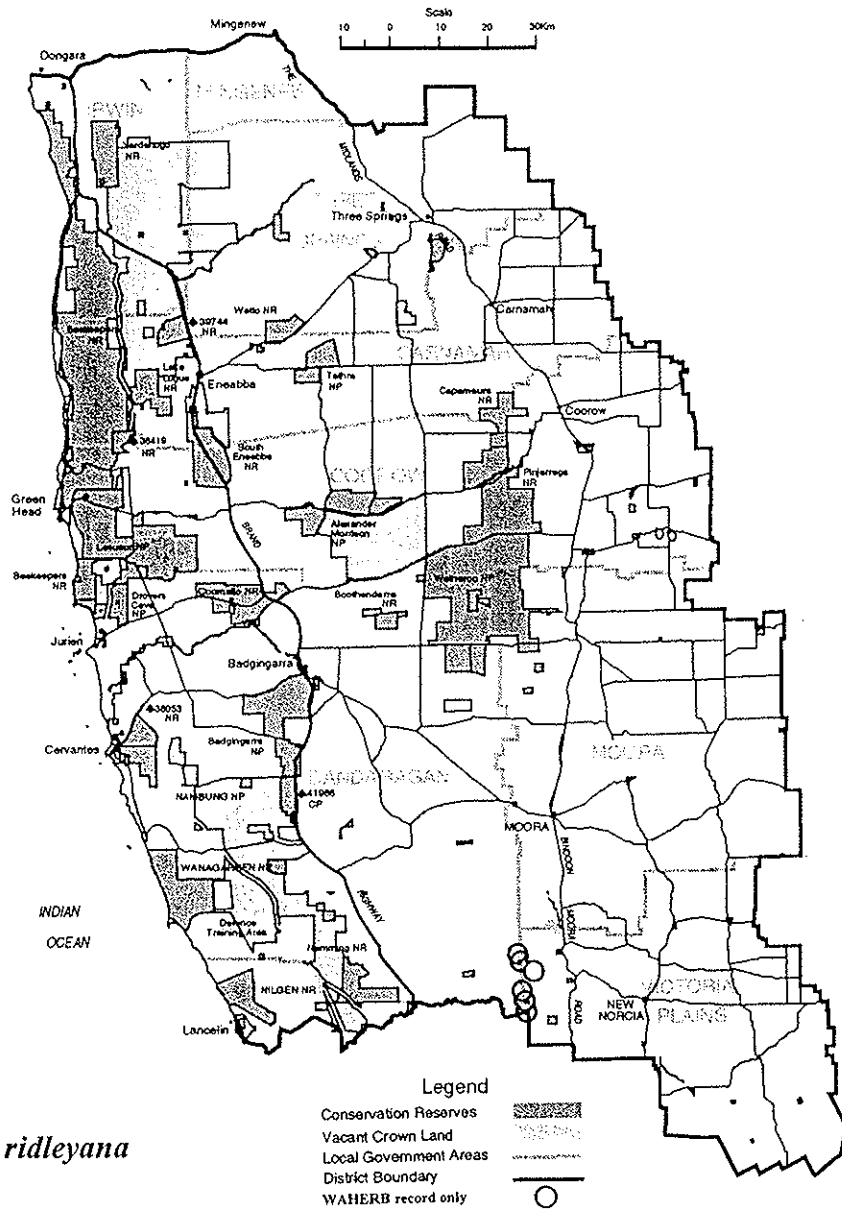
- Ensure that dieback hygiene procedures are carried out at all populations.

### **Research Requirements**

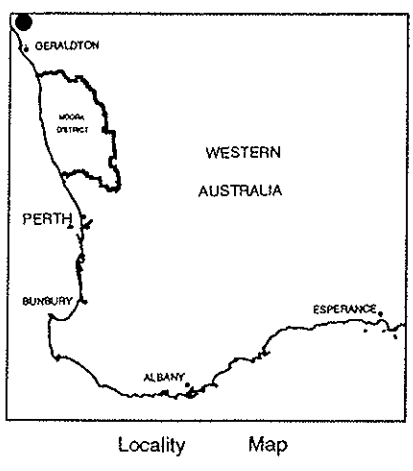
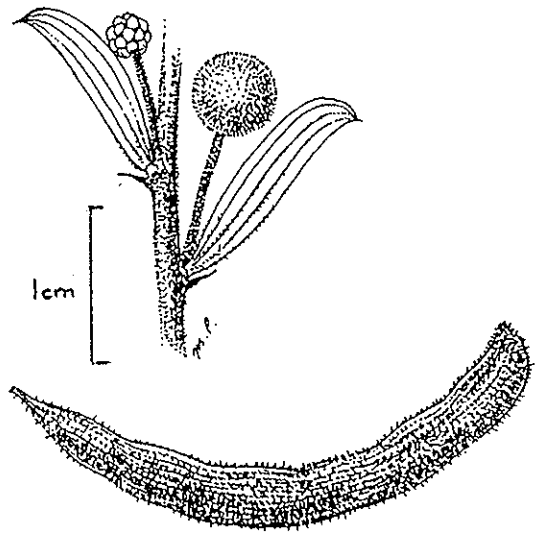
- Further survey is required.

### **References**

Fitzgerald (1904).



● *Acacia ridleyana*



An erect, small shrub to 0.5 m tall. The female plants are many-stemmed and lignotuberous, the males are slender and tufted. There are few internodes to the branchlets, which are short, 1-3 cm long. The terminal internodes on each branchlet are much longer than the lower internodes. The scale leaves are in whorls of four on the branchlets and are small, 0.3-0.6 mm long. The male flowering spikes are sessile, in whorls of four. They are ovoid in shape, 5 mm long. The female cones are small, sessile, and clustered on the branches or older wood near the base of the plant. They are ovoid to subglobular, 1-1.5 cm long. The bracteoles are without a dorsal awn. The nuts are completely concealed in golden hairs and the wing is very small or absent.

**Flowering Period:** September-November

#### **Distribution and Habitat in the Moora District**

This species has been recorded from east of Eneabba south through the Moora District to Mogumber but has only been recorded in the last twenty years from east of Eneabba and Badgingarra. It has been reported from several populations in the Lesueur area.

It grows in grey sand, sandy loam or white clay and lateritic gravel or on quartz hills at Mogumber, in low heath.

#### **Conservation Status**

Current: Priority 3

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.*SE of Badgingarra	D	-	27.1.1981	-	-
2.*Tathra	Ca	National Park	11.11.1978	-	-
3.*Winchester	Ca	-	3.1970	-	-
4.*Coomalloo	D	-	29.10.1966	-	-
5.*N of Badgingarra	D	-	13.8.1965	-	-
6.*SE of Badgingarra	D	-	8.1.1966	-	-
7.*Mogumber	VP	-	1.1936	-	-
8.*Near Cockleshell Gully	-	-	Undated	-	-

#### **Response to Disturbance**

Unknown

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

Presumed susceptible

#### **Management Requirements**

– Ensure that dieback hygiene procedures are carried out at all populations.

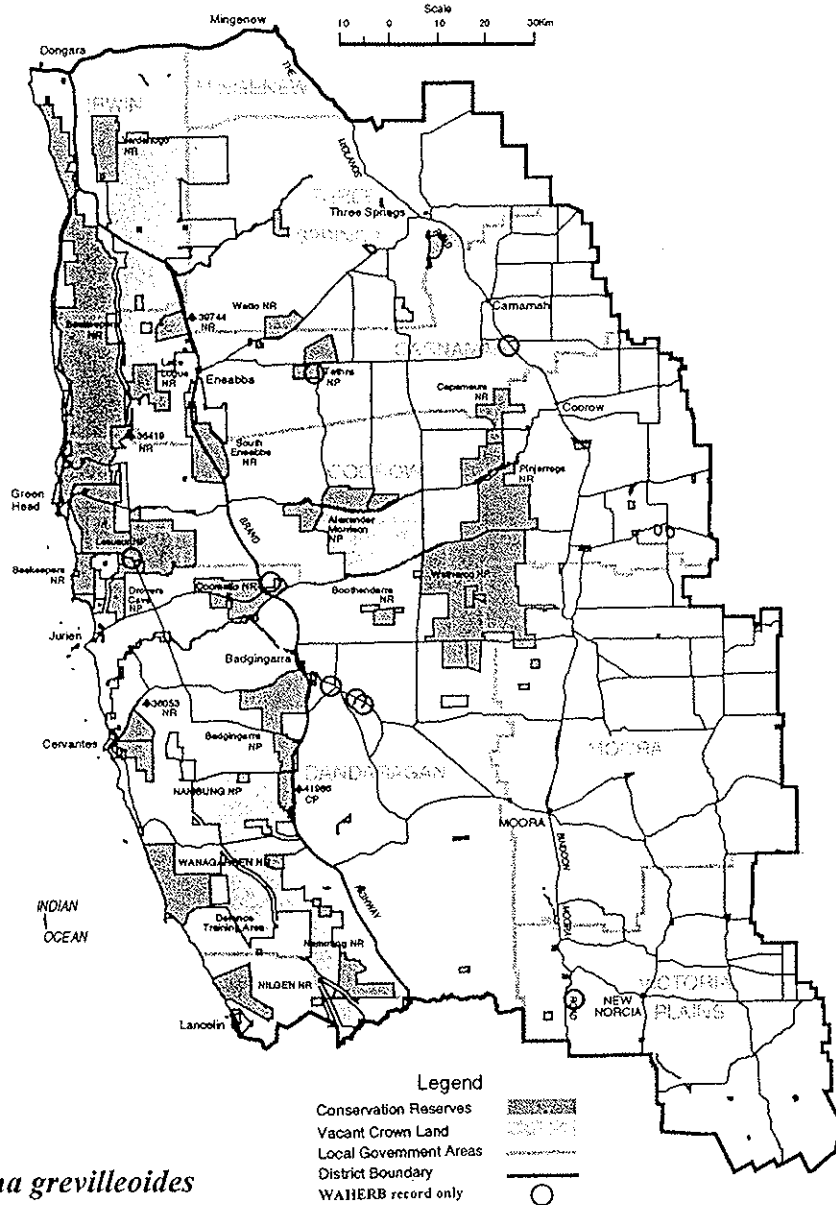
#### **Research Requirements**

– Further survey is urgently required, particularly in the Lesueur National Park.

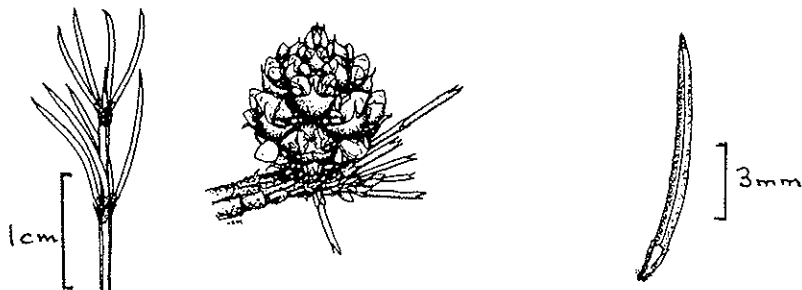
#### **References**

Bennett (1982), Wilson and Johnson (1989).

Illustrations by D. Mackay.



*Allocasuarina grevilleoides*



An erect, dense shrub without a lignotuber, to 1.3 m tall with much-divided and whorled branches. The branchlets have 2 to 3 internodes of similar length. There are four scale leaves in each whorl. The males spikes are in clusters of up to 6, at the base of the branchlets or at the branchlet nodes or are terminal. They are ovoid in shape.

The cones are 12-20 mm long, cylindrical to ovoid with large ovate bracts which have a tomentose surface.

**Flowering Period:** September-November

#### **Distribution and Habitat in the Moora District**

This species occurs from Three Springs south to Dandaragan, with one population occurring in the Swan Region just south of the Moora District south-east of Mogumber.

Grows in grey sand, sandy loam, white clay or clay loam with lateritic gravel, in low shrubland or low heath with mallees. It sometimes occurs on the top of breakaways.

#### **Conservation Status**

Current: Priority 3

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Alexander Morrison	Co	National Park	1.5.1991	100	Undisturbed
2. SW of Three Springs	TS	Nature Reserve	14.10.1989	-	-
3.* SE of Badgingarra	D	-	27.1.1981	-	-
4.* N of Dandaragan	D	-	23.8.1968	-	-
5.* S of Eneabba	Co	-	29.10.1966	-	-
6.* N of Dandaragan	D	-	9.10.1957	-	-
7.* N of Dandaragan	D	-	23.8.1948	-	-
8.* N of Dandaragan	D	-	19.8.1949	-	-

#### **Response to Disturbance**

Unknown

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

Presumed susceptible

#### **Management Requirements**

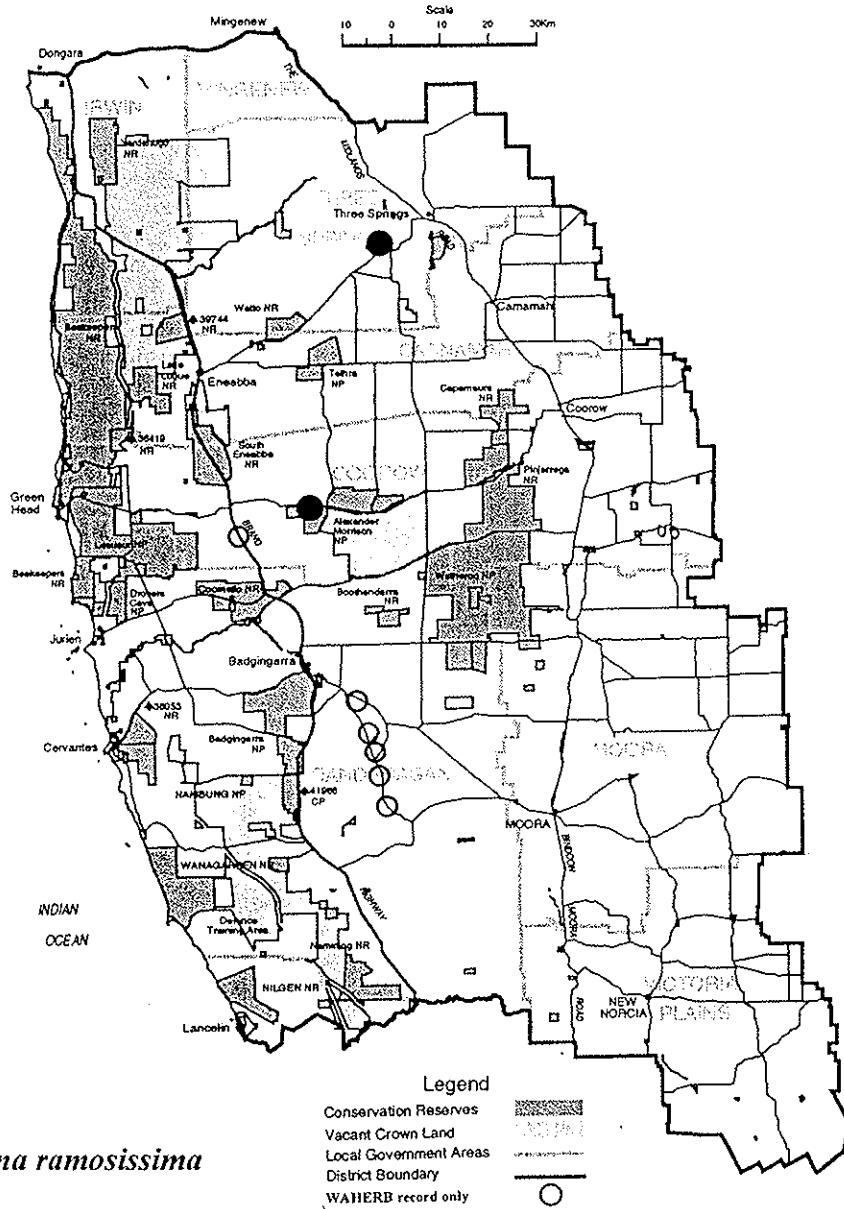
- Ensure that dieback hygiene procedures are carried out at all populations.

#### **Research Requirements**

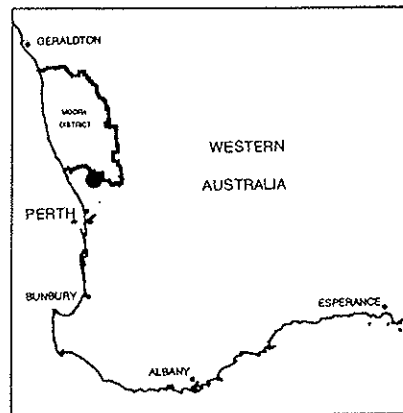
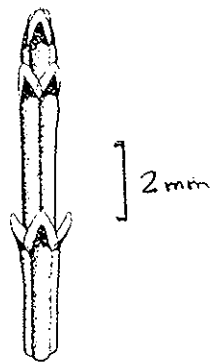
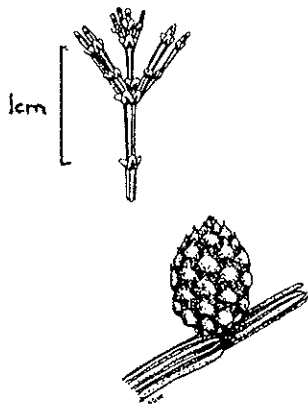
- Further survey is required.

#### **References**

Bennett (1982), Gardner (1964), Wilson and Johnson (1989).  
Illustrations by D. Mackay.



● *Allocasuarina ramosissima*



Locality Map

A low, spreading, lignotuberous shrub to 0.6 m tall, and 1.2 m in diameter, multistemmed. The lateral branches are often horizontal and subterranean before emerging. The leaves are linear, pungent, slightly glaucous when young and 1-3 cm long, 1-1.5 mm wide, with revolute margins. The flowers are in terminal or lateral, spherical inflorescences. They are pale yellow in colour, the perianth of each flower is 17-20 mm long, the anther-bearing part of the perianth, the limb, is glabrous. The pistil is 19-24 mm long, gently curved with a down turned apex. There are up to 25 follicles in each fruiting cone. Each follicle is ovate-elliptic, flattened, hirsute when young, becoming glabrous with age, opening after fire.

The specific name refers to the small flowers. This species can be confused with *Banksia sphaerocarpa* var. *sphaerocarpa* which occurs within the same range. It differs in having a hairy perianth limb.

**Flowering Period:** January, March-July, September

#### Distribution and Habitat in the Moora District

Occurs from Eneabba south to the Badgingarra area, and south of the Moora District in the Bindoon to Gingin area.

Grows in grey or white sand and laterite, in low heath, sometimes with emergent eucalypts, on upland areas.

#### Conservation Status

Current: Priority 3

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* W of Mt Lesueur	D	Gravel Reserve	27.3.1977	-	-
2.* Mt Lesueur	D	National Park	17.7.1979	-	-
3.* S of Eneabba	Ca	VCL (Mining Lease)	1.10.1977	-	-
4.* E of Greenhead	Co	-	24.3.1977	-	-
5. W of Badgingarra	D	National Park	7.5.1984	Common-WH	-
6.* SSW of Eneabba	Co	-	31.7.1980	-	-
7.* SE of Eneabba	Ca	Govt. Requirements Reserve	20.5.1981	-	-
8. SW of Badgingarra	D	National Park	27.3.1984	-	-
9.* N of Cockleshell Gully	D	-	1.9.1968	-	-
10.* Warradarge	Co	-	5.3.1975	-	-

#### Response to Disturbance

The follicles of the fruit open after fire releasing the seed. The species is fire tolerant, sprouting from the lignotuber.

#### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

#### Management Requirements

— Ensure that dieback hygiene procedures are carried out at all populations.



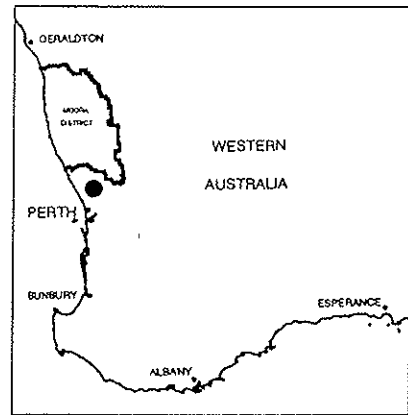
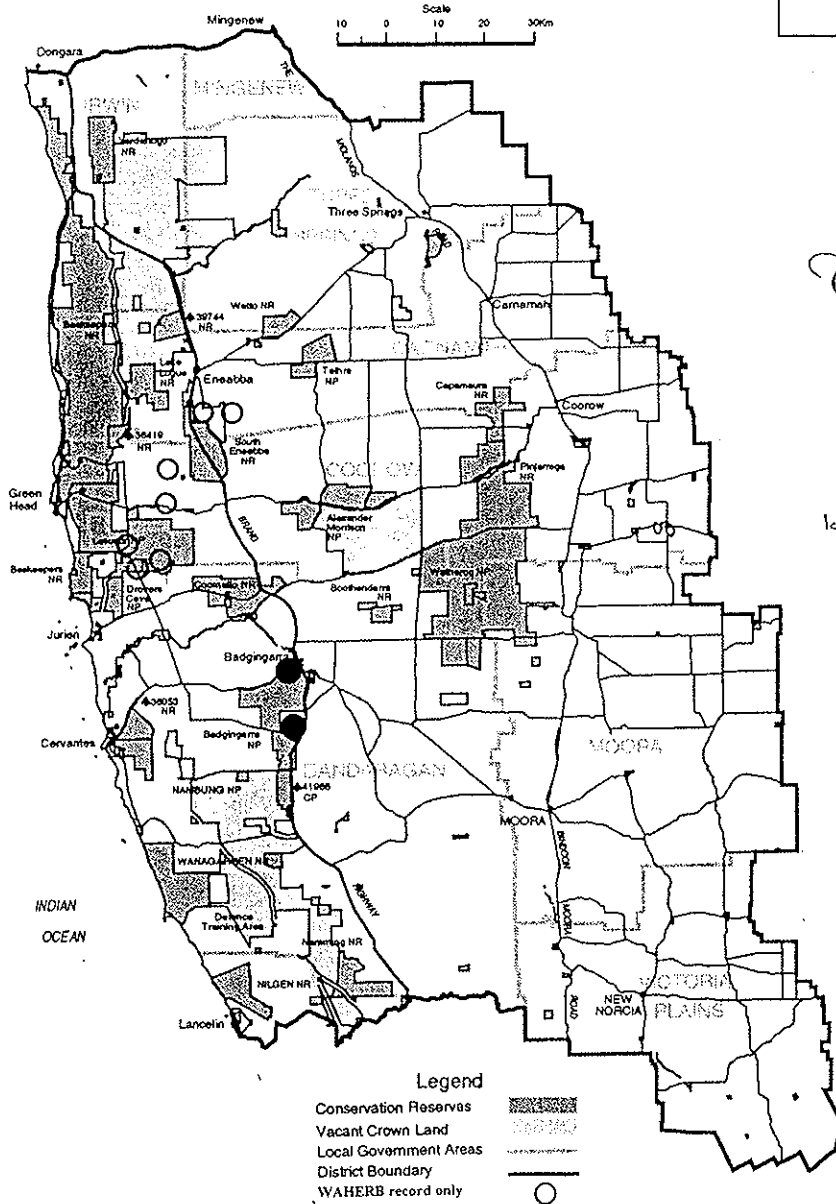
## Research Requirements

- Further survey is required.

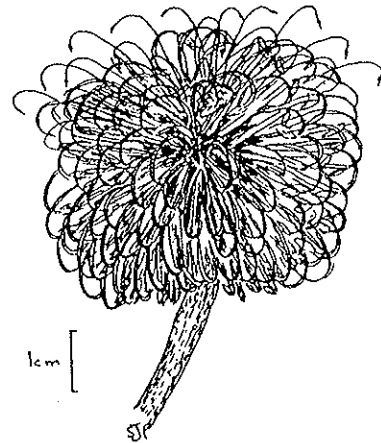
## References

George (1981, 1984b), Taylor and Hopper (1988).

### ● *Banksia micrantha*



Locality Map



## *Banksia scabrella* A.S.George

PROTEACEAE

Burma Road Banksia

A spreading shrub to 2 m tall and 3 m wide, without a lignotuber and with white tomentose branchlets. The leaves are scattered, linear, 8-28 mm long and 1 mm wide. They have revolute margins and are white-woolly on the lower surface, rough to the touch on the upper surface. The flower spike is erect, cylindrical-ovoid, 3-6 cm long and 7-9 cm wide with many tomentose bracts at the base. The flowers are mainly cream to pale yellow, the upper ones and the styles purple. The perianth is pubescent inside and outside, and is 27-35 mm long. The pistil is 34-45 mm long with a narrowly ovoid pollen presenter, the style end is hooked. There are up to 80 narrowly elliptic follicles on the fruit, usually opening with fire.

**Flowering Period:** September-January

### Distribution and Habitat in the Moora District

In the Moora District this species occurs to the south-east of Dongara. It also occurs further north in the Geraldton District to the east of Walkaway. The species has a total geographic range of ca. 85 km.

Grows in deep white or yellow sand in heath, sometimes with *Eucalyptus todtiana*.

### Conservation Status

Current: Priority 3

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Skipper Road	TS	VCL	8.11.1991	1	Undisturbed
2. Robb Road	TS	VCL	8.11.1991	2	Undisturbed
3. Yandanooka West Road	Mi	Shire Road Verge	27.2.1986	>100	-
4. Yandanooka West Road	Mi	Shire Road Verge	27.2.1986	1-10	-
5. Yandanooka West Road	Mi/TS	Shire Road Verge	27.2.1986	>100	-
6. Yandanooka West Road	Mi/TS	Shire Road Verge	27.2.1986	>100	-
7. Tomkins Road	TS	Shire Road Verge	8.5.1986	1-10	-
8. Sundalara Road	TS	Shire Road Verge	8.5.1986	10-100	-
9. Yandanooka West Road	Mi/I	Shire Road Verge	27.2.1986	>100	-
10. ENE of Yandanooka Hill	TS	-	1.2.1986	10-100	-
11. ESE of Yandanooka Hill	TS	-	1.2.1986	>100	-
12. E of Yandanooka Hill	TS	Shire Road Reserve	1.2.1986	>100	-
13. SE of Yandanooka Hill	TS	-	1.2.1986	>100	-
14. SSE of Yandanooka Hill	TS	-	1.2.1986	>100	-
15. SW of Yandanooka Hill	TS	-	1.2.1986	>100	-
16. WSW of Yandanooka Hill	TS	-	1.2.1986	>100	-
17.* W of Mt Adams	I	-	15.11.1979	-	-
18.* W of Arrino	TS	-	30.8.1977	-	-
19.* W of Arrino	TS	-	17.10.1971	-	-

### Response to Disturbance

Killed by fire, regenerating from seed.

### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

## Management Requirements

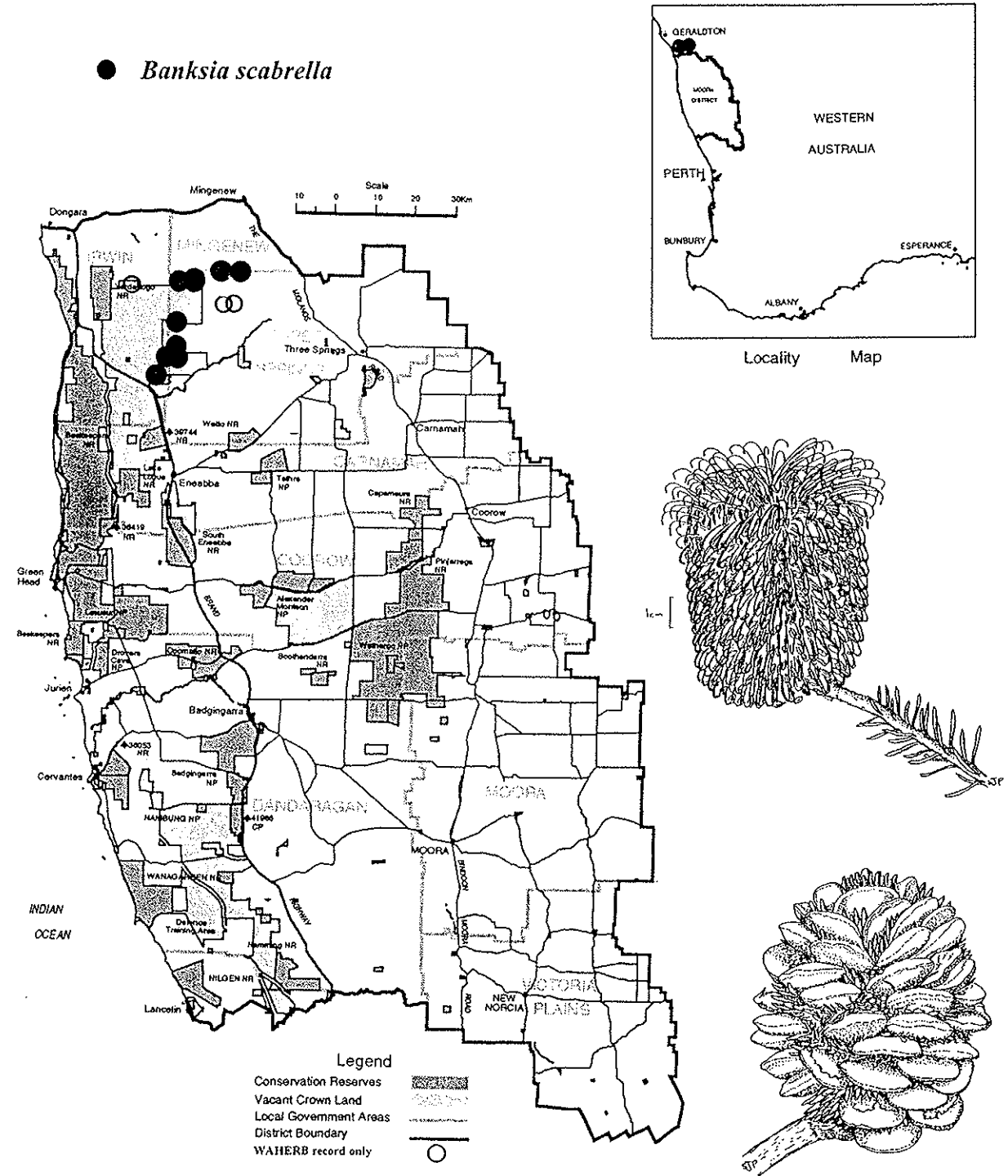
- Ensure that dieback hygiene procedures are carried out at all populations.

## Research Requirements

- Further survey is required, particularly to assess the extent of the species on vacant crown land south of Mt Adams.

## References

George (1981, 1984b), Griffin *et al.* (1982), Taylor and Hopper (1988).



A dense, robust shrub to 1 m tall. The branches are hairless, the branchlets sparsely hairy. The leaves are opposite, decussate, elliptic and keeled, to 4 mm long and 1.9 mm wide, hairy when young. The flowers are 10-12 mm long, in dense heads. The calyx is up to 4.1 mm long including the teeth, and is hairy. The five petals are ca. 3.5 mm long, pink in colour. The stamens are in five bundles, ca. 12 mm long, each bundle of 4-5 stamens united to about half way to form the claw. The basal half of the claw and the upper half of the stamens is pink or reddish-purple, the rest of the filament white or pale yellow. The fruit is a capsule ca. 6 mm long, ovoid and woody.

This species is distinguished by the two-coloured staminal bundles, which are either pink and white, or reddish-purple and pale yellow.

This species is related to *Beaufortia elegans* which is a more slender plant with smaller obovate leaves with thickened margins, glabrous when young, with a smaller calyx, to 2.5 mm long, glabrous at least on the teeth, and with staminal bundles to 8 mm long, each of 6-9 stamens, pinkish-mauve or reddish-purple in colour. It is also related to *B. eriocephala* which is densely white-woolly, and to *B. elegans*, which is more slender and has a staminal claw much longer than the free part of the filaments.

**Flowering Period:** November-December

#### Distribution and Habitat in the Moora District

Occurs between Eneabba and Dandaragan on sandplain, in white sand over laterite or grey sandy loam. Grows in low scrub or heath sometimes with emergent *Banksia* and *Adenanthos* species.

#### Conservation Status

Current: Priority 3

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* S of Badgingarra	D	-	5.12.1982	-	-
2.* W of Eneabba	Ca	-	23.12.1978	-	-
3.* S of Wongonderra Road	D	-	14.11.1978	-	-
4.* S of Coomallo Creek	D	-	16.12.1976	-	-
5.* Coorow-Greenhead Road	Co	-	27.11.1977	-	-
6.* W of New Badgingarra	D	-	1.11.1974	-	-
7.* W of Coorow	Ca	-	24.11.1971	-	-

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

#### Management Requirements

— Ensure that dieback hygiene procedures are carried out at all populations.

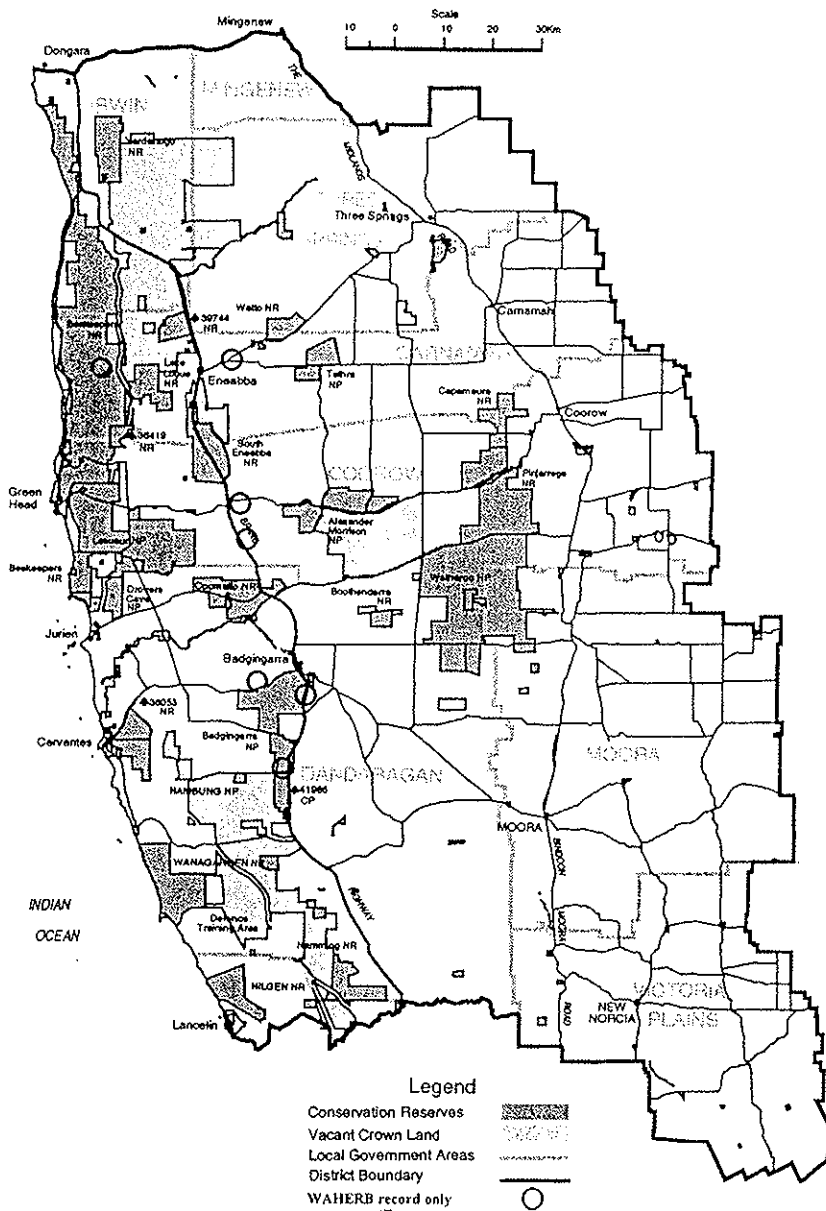
## Research Requirements

- Further survey is required.

## References

Strid (1987).

### *Beaufortia bicolor*



*Beaufortia eriocephala* W.Fitzg.

MYRTACEAE

Woolly Bottlebrush

A spreading shrub to 70 cm high, the branchlets, leaves and inflorescences covered with spreading, woolly white hairs. The leaves are opposite, linear to linear-lanceolate, 6-8 mm long. The bracts are broadly ovate and all are shorter than the calyxes. The flowers are in dense, globular or ovoid, woolly heads, which before expansion, form a woolly mass with the black points of the bracteoles and calyx protruding. The calyx tube is ca. 2 mm long and the lobes are as long as the tube. The petals are red, as long as the calyx lobes and are tomentose on the back and edges. The stamens are scarlet or reddish-purple, 9-10 mm long. They are in bundles of 5, the woolly claw as long as or shorter than the glabrous filaments.

This species is allied to *Beaufortia purpurea*, but differs in the woolly, white hairs on the foliage and inflorescence, in the bracts which are shorter than the calyx, in the petals which are not shorter than the calyx segments and in the woolly staminal claws.

**Flowering Period:** September-December

**Distribution and Habitat in the Moora District**

Occurs between Badgingarra and Mogumber, the type collection having been made from the Moora area.

Grows in sandy loam, brown loam over gravel or sand over laterite in low heath, sometimes beneath marri woodland.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SE of Cataby	D	Gravel Reserve	24.11.1993	1000+	Growing around areas of gravel extraction
2. E of Regans Ford	D	Shire Road Verge	24.11.1993	200+	Healthy
3. W of Mogumber	D	-	17.12.1992	-	-
4. SSW of Gillingarra	VP	Nature Reserve	8.11.1990	-	-
5. W of Moora	D	Private	13.9.1988	-	-
6. S of Gillingarra	VP	-	17.9.1983	Occasional-WH	-
7. N of Mogumber	VP	-	26.10.1982	-	-
8. E of Dandaragan	D	Shire Reserve	19.12.1984	-	-
9. NW of Moora	D	-	19.12.1984	-	-
10.* Badgingarra	D	-	3.11.1962	-	-
11.* Moora	-	-	1903	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

### Management Requirements

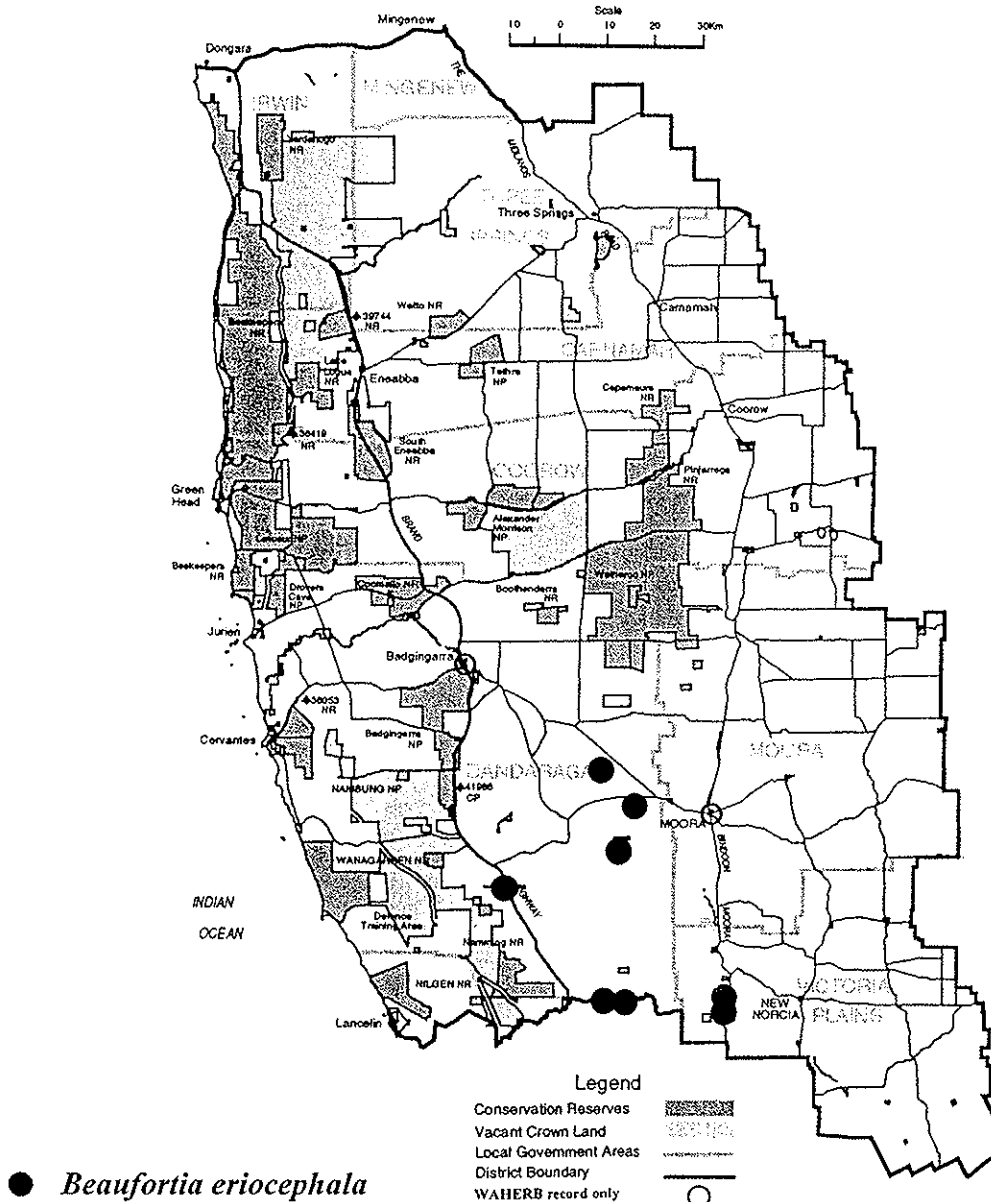
- Ensure that dieback hygiene procedures are carried out at all populations.

### Research Requirements

- Further taxonomic work is required.
- Further survey is required.

### References

Blackall and Grieve (1980), Fitzgerald (1905).



A small, erect, much-branched shrub to ca. 0.5 m tall. The leaves are crowded on the younger branches. They are terete, glabrous and short, 8-12 mm long. The flowers are grouped 1-5 in short clusters around the branches amongst the leaves. They have their parts in fives. The calyx tube is densely hairy. There are five narrow petals and five dark pink staminal claws to 25 mm long. The fruits are hairy at first, becoming glabrous with age. They are depressed-globular to almost cylindrical in shape, usually flat at the top or with one lobe elongated and curved into the opening. They are 4-5 mm long and ca. 5 mm wide.

This species is related to *Calothamnus hirsutus*, differing in its smaller fruits, shorter leaves and dull, dark brown seeds.

**Flowering Period:** January-February

#### Distribution and Habitat in the Moora District

In the Moora District this species is known from east of Piawaning, on the eastern boundary, to the Marchagee area. It is also known from the Wongan Hills and the Dowerin, Cunderdin, Tammin and Corrigin areas.

At Marchagee the species grows in yellow, sandy loam with *Melaleuca acuminata* and *Thryptomene prolifera*. Other populations outside the Moora District grow in grey white sandy soil, with *Xylomelum angustifolium* and *Banksia prionotes* or scrub heath to 4 m with *Eucalyptus*, *Allocasuarina* and *Leptospermum* species.

#### Conservation Status

Current: Priority 3

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. E of Piawaning	VP	Shire Road Verge	1.11.1986	2	Weed infested
2.* S of Piawaning	VP	-	1.1968	-	-
3.* Marchagee	Co	Nature Reserve	1.6.1977	2	-

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

#### Management Requirements

- Inspect population 1.
- Ensure that dieback hygiene procedures are carried out at all populations.

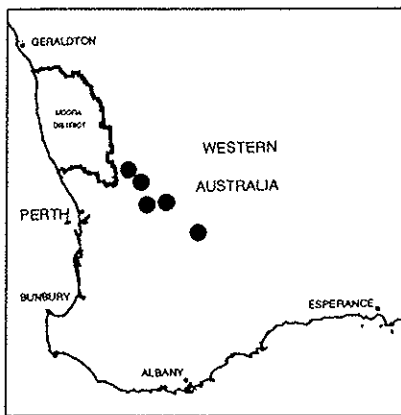
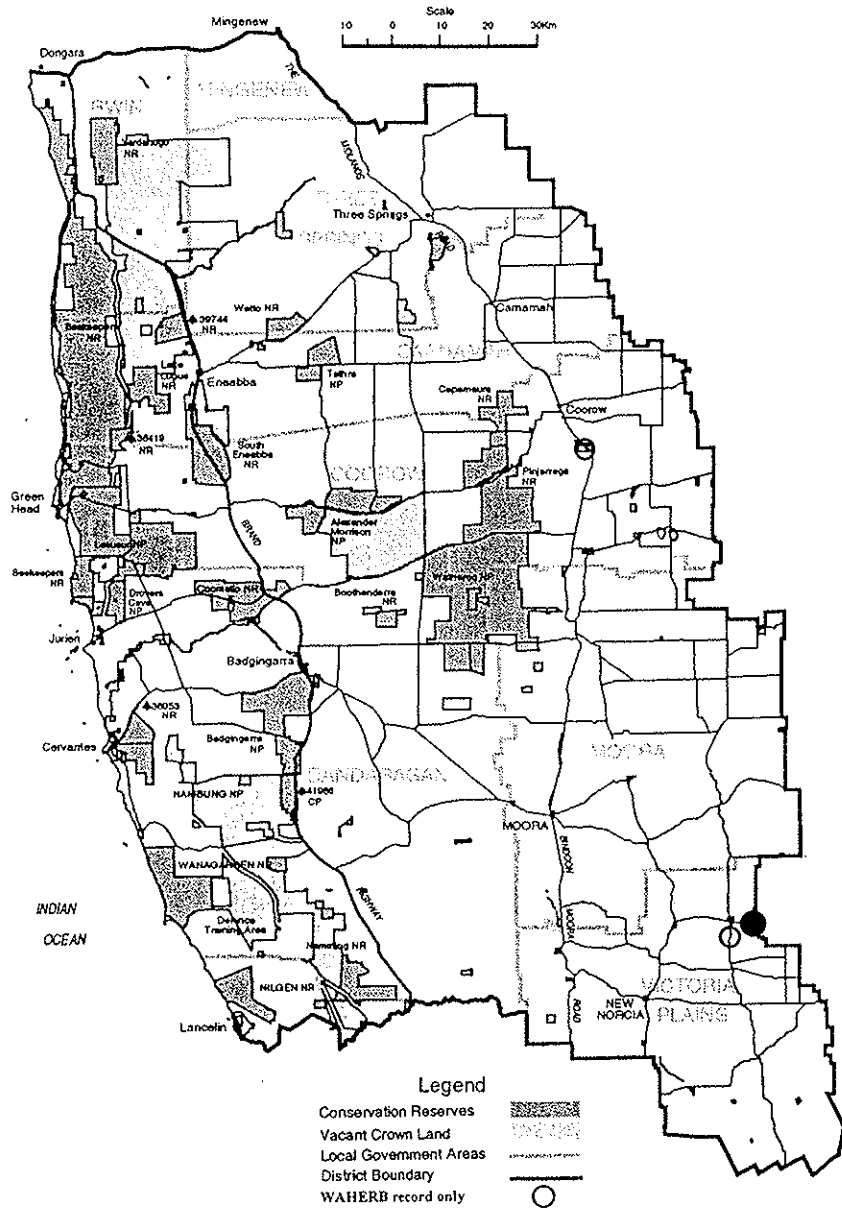
#### Research Requirements

- Further survey is required, particularly to re-find populations 2 and 3.

#### References

Hawkeswood (1984a), Mollemans *et al.* (1993).





Locality Map

● *Calothamnus brevifolius*

A tufted herb to ca. 25 cm tall, growing in small, dense clumps. The leaves are flattened, ca. 1 mm wide. The spikelets are light brown in colour.

**Flowering Period:** October

**Distribution and Habitat in the Moora District**

Occurs in the area around Badgingarra and ca. 35 km further north.

Grows in grey or white sand over laterite in heath with species of *Hakea* and *Acacia* and with scattered *Eucalyptus todtiana*.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Bibby Road	D	-	6.9.1990	-	-
2. N of Badgingarra	Co	National Park	20.10.1987	Occasional-WH	-
3.* W of Badgingarra	D	-	-	-	-
4.* N of Badgingarra	Co	-	-	Locally frequent	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

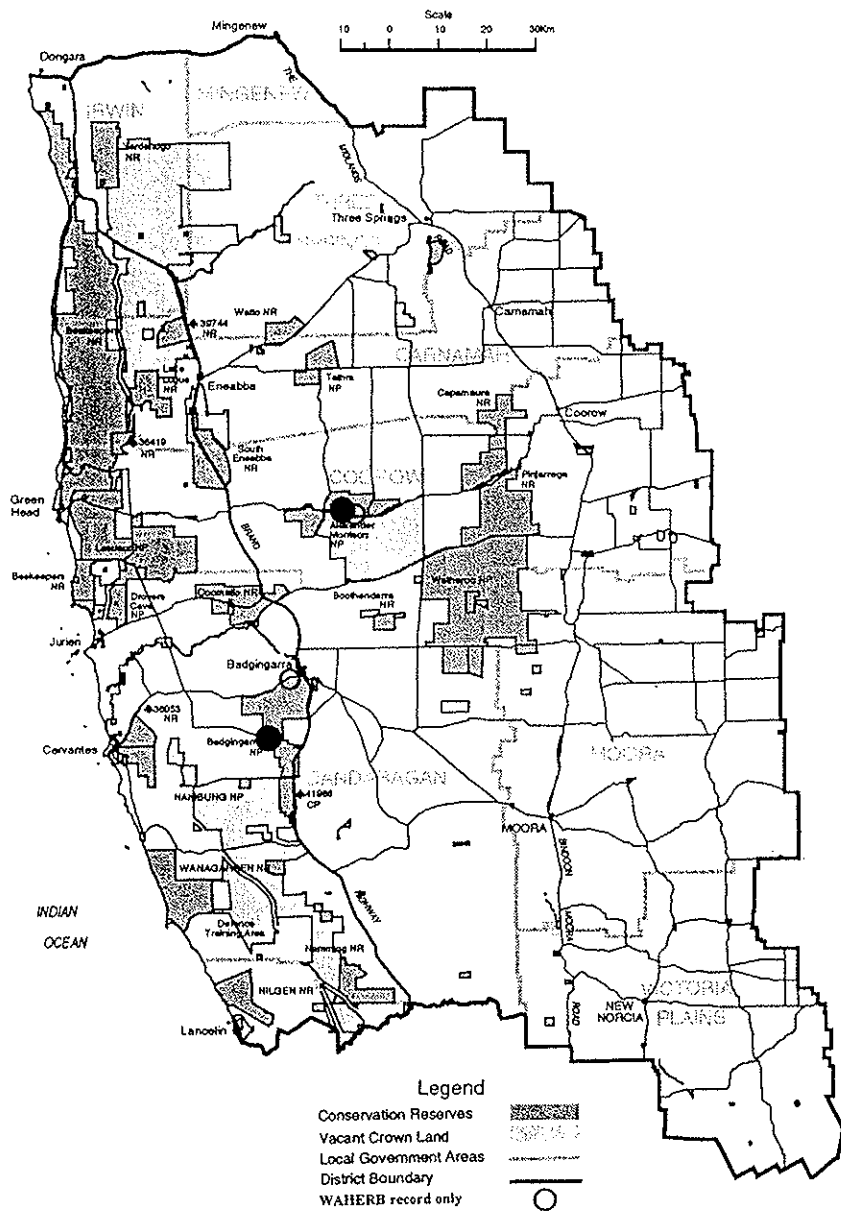
Unknown

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required.



● *Catocolea enodis ms*

A low, spreading shrub, often compact or erect and 0.2 to 0.7 m tall and to 1 m in diameter. The leaves are linear, 3-6 mm long. The flowers are small, ca. 5 mm long, with a deeply-ridged floral tube. They are dark maroon or magenta-purple-mauve in colour. The stigma is exserted, exceeding the length of the petals and is capitate, with a papillate surface.

**Flowering Period:** October-November in the Moora District, August-September in the Geraldton District

#### Distribution and Habitat in the Moora District

*Chamelaucium conostigmum* ms is found on the eastern side of the District from north of Coorow to south of Moora. Also occurs near the Wongan Hills and Meckering in the Merredin District, and in the southern part of the Geraldton District.

Grows near the edges of saline lakes, creeks or on salt flats, in white, yellow or grey sand or sandy clay. Associated vegetation is usually low, open scrub, with species of *Verticordia*, *Frankenia* and *Darwinia*, but at the most southerly population it occurs in low, open woodland of *Eucalyptus rudis* with scrub.

#### Conservation Status

Current: Priority 3

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SE of Coorow	Co	Private	16.10.1991	Frequent-WH	-
2. N of Watheroo	Mo	-	16.10.1991	Occasional-WH	-
3. Koodjee	VP	Nature Reserve	14.11.1990	6	Past disturbance
4. E of Coorow	Co	Shire Road Verge	15.11.1990	50+	Undisturbed
5. S of Coorow	Co	-	11.10.1982	Locally frequent-WH	-
6.* S of Coorow	Co	MRWA Road Verge	17.10.1976	-	-
7.* E of Winchester	Ca	-	28.11.1974	-	-

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

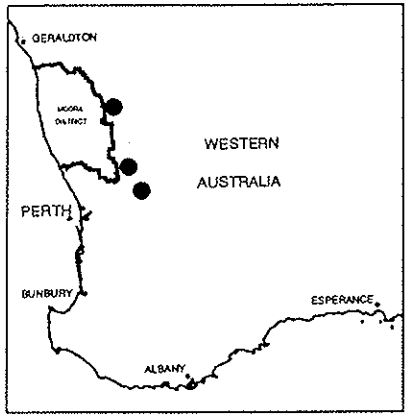
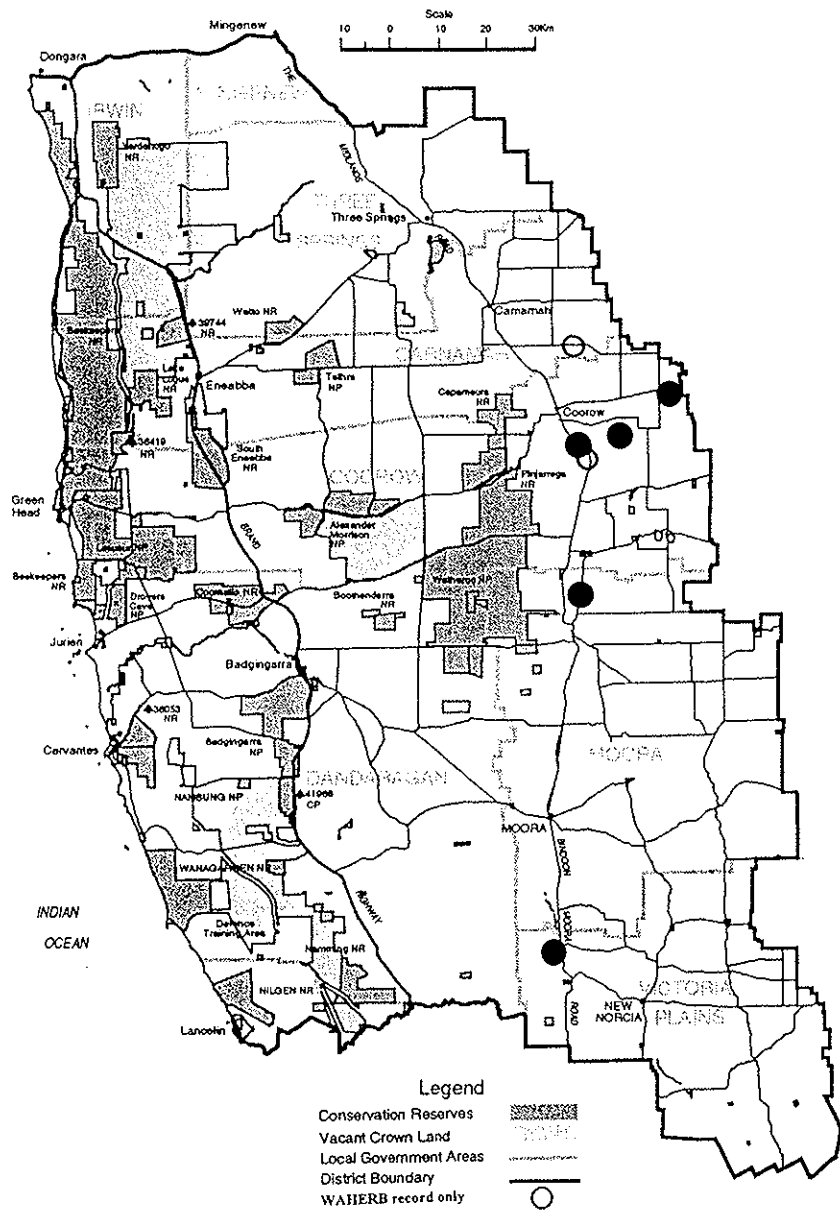
Presumed susceptible

#### Management Requirements

- Population 3 should be fully surveyed.
- Ensure that dieback hygiene procedures are carried out at all populations.

#### Research Requirements

- Further survey is required, particularly on suitable habitat in conservation reserves.



● *Chamelaucium conostigmum* ms

## *Comesperma acerosum* Steetz

## POLYGALACEAE

An erect, leafy shrub, little-branched, 0.3 to 0.8 m high. The leaves are linear, pungent and keeled, ca. 10 mm long. The flowers are in dense racemes, to 5 cm long and each flower has free outer sepals which are much shorter than the wings. The standard and keel petals are mauve-purple, the wings yellow and mauve-purple. The keel petal is horned. The fruit is a capsule ca. 6 mm long, broad at the top, with a blunt or three-toothed apex, narrowing to a stipe as long as the broad part. The seeds have a tuft of hairs.

**Flowering Period:** September-December

### Distribution and Habitat in the Moora District

Occurs mainly between Eneabba and Badgingarra in the Moora District, with an easterly occurrence at Watheroo. It has also been recorded from south-east of Geraldton in the Geraldton District. A taxon with an affinity to this species occurs on the south coast in the Cape Arid area.

Grows in grey or white sand with lateritic gravel or clay, in low heath and open shrubland.

### Conservation Status

Current: Priority 3

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Mt Peron	D	National Park	29.11.1992	Occasional-WH	-
2. SW of Eneabba.	Co	-	22.9.1994	Frequent-WH	Burnt 1991-92
3. SE of Mt Lesueur	D	National Park	13.11.1993	Frequent-WH	-
4. E of Jurien	D	-	9.10.1985	-	-
5. Tathra	Ca	National Park	23.10.1982	-	-
6.* W of Badgingarra	D	-	1.11.1974	-	-
7.* Table Hill	D	-	9.10.1977	-	-
8.* N of Mt Benia	D	-	19.10.1979	-	-
9.* N of Badgingarra	D	-	15.12.1976	-	-
10.* S of Eneabba	Ca	VCL (Mining Lease)	13.9.1977	Scattered-WH	-
11.* E of Greenhead	Co	-	28.11.1974	Occasional, in groups of 3-4 plants-WH	-
12.* Cockleshell Gully	D	-	22.10.1979	-	-
13.* NW of Badgingarra	D	-	1.11.1965	-	-
14.* N of Cockleshell Gully	Co	-	8.10.1967	-	-
15.* Watheroo	Mo	-	30.11.1961	-	-

### Response to Disturbance

Population 2 was recorded in an area burnt two years previously.

### Susceptibility to *Phytophthora* Dieback

Unknown

### Management Requirements

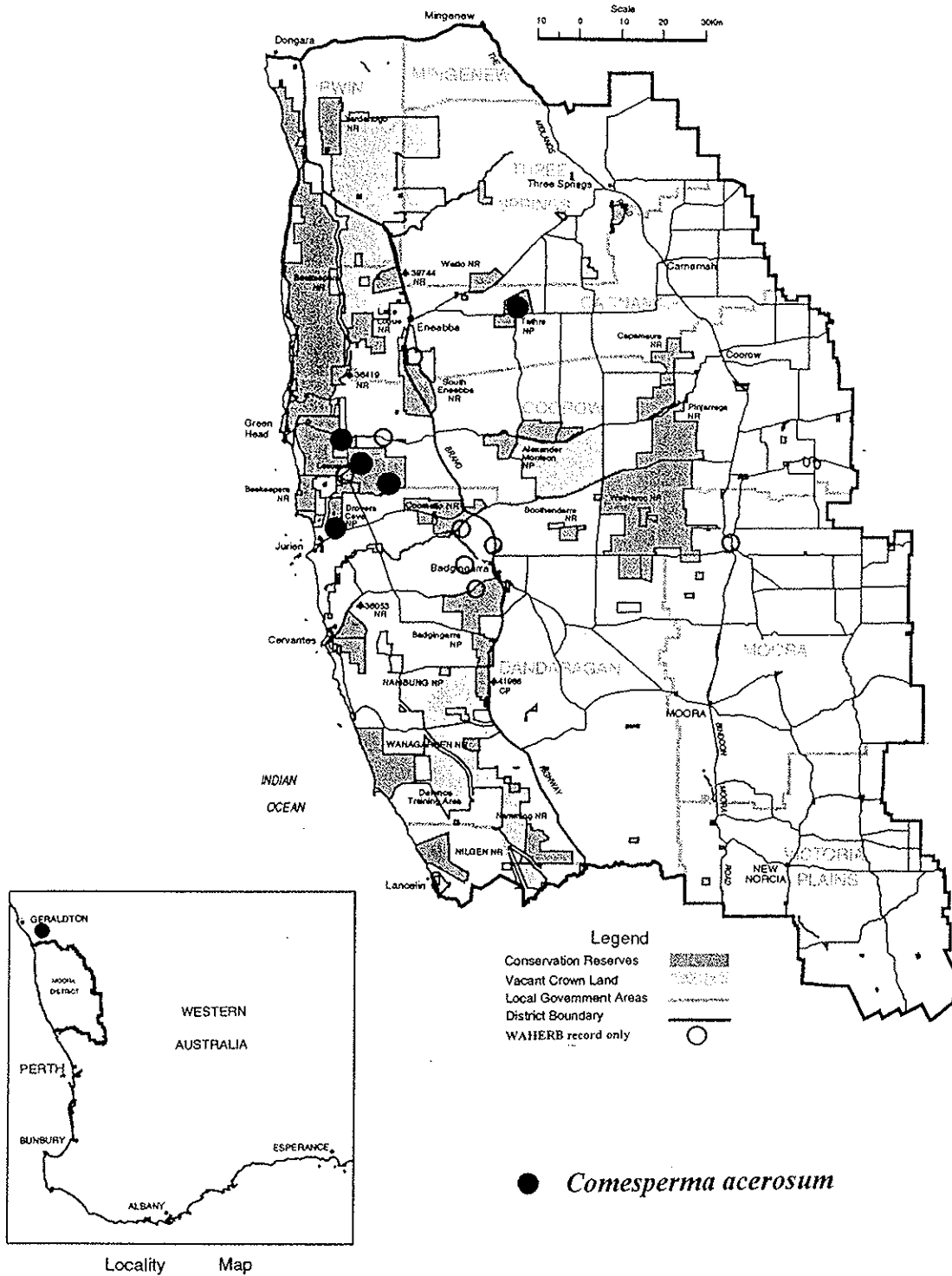
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required, particularly in the Lesueur National Park where it has been reported from many populations.

**References**

Bentham (1863), Blackall and Grieve (1985).



## *Conospermum eatoniae* E.Pritz.

## PROTEACEAE

A small shrub to ca. 75 cm tall and about 1 m wide, intricately branched with many stems, forming a dense rounded shape. The stems are glabrous and leafless and the leaves arise from the base of the plant, disappearing with age. They are obovate to oblong in shape. The flowers are arranged in short, terminal panicles which are dichotomously branched. They are bright blue in colour and hairless. The perianth is two-lipped, the upper lip with an acute, recurved apex, and the lower lip three-lobed. The nut has orange hairs and is ca. 2 mm long.

The degree of branching in the panicle is less in younger plants and is also less in plants at the north of the range.

**Flowering Period:** August-October

### **Distribution and Habitat in the Moora District**

This species has been recorded over a wide range, from north of Badgingarra and Watheroo to Gillingarra in the Moora District and through the central wheatbelt from Dowerin, Kellerberrin, Tammin and Quairading, and further south. There is also a report of the species from west of Coorow.

It grows in grey or yellow sand on low areas sometimes near lakes, in scrub heath, or open low banksia woodland. One population was recorded from sandy clay loam over granite.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* NW of Watheroo	Mo	National Park	7.10.1971	-	-
2.* N of Badgingarra	Co	-	29.9.1979	Occasional-WH	-
3. N of Gillingarra	VP	-	25.7.1985	-	-

### **Response to Disturbance**

One population had regenerated in a paddock cleared and sown with tagasaste.

Two healthy populations are on areas which are grazed at times.

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

Presumed susceptible

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

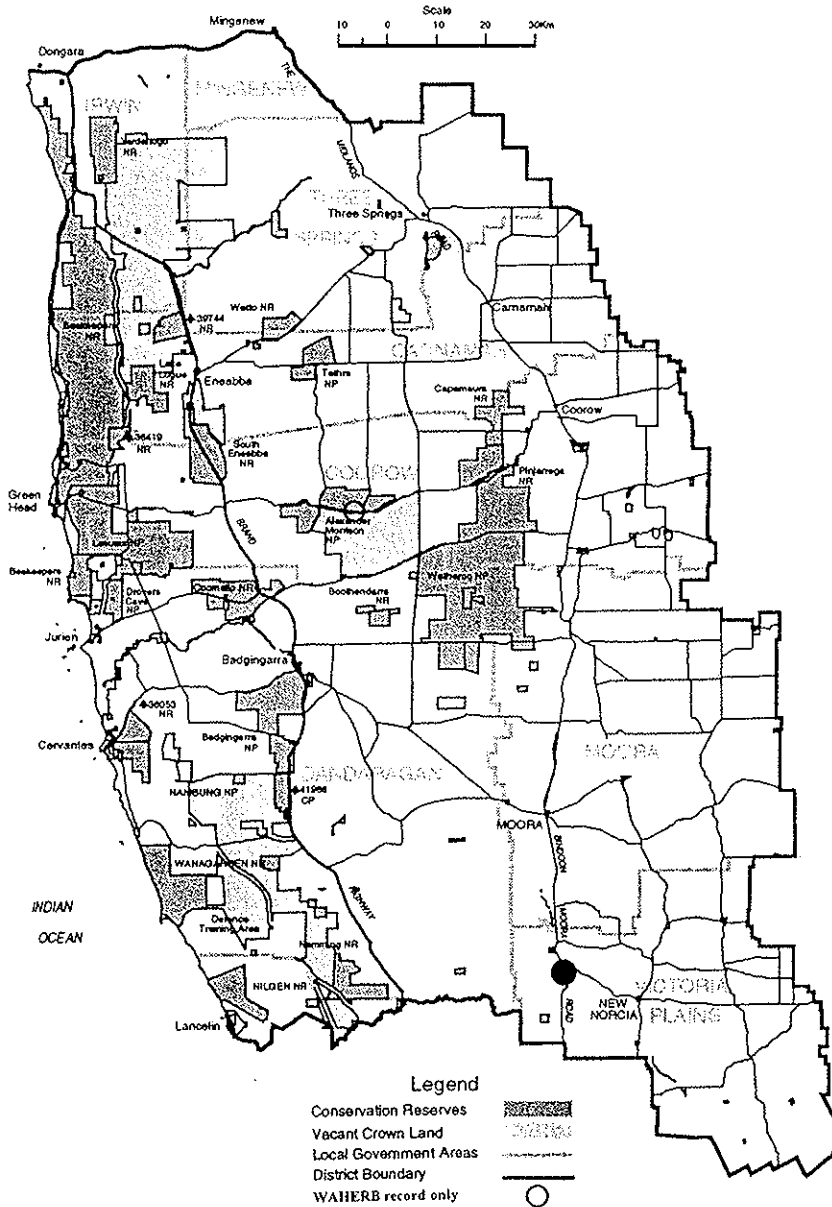
### **Research Requirements**

- Further survey is required, particularly to re-find populations previously recorded in the District.

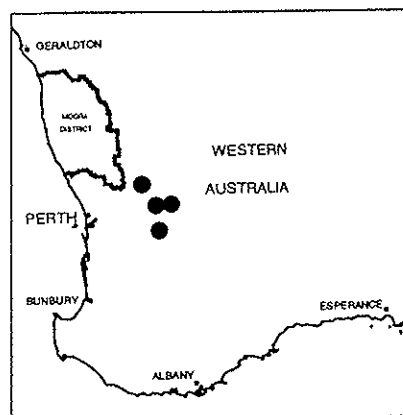
### **References**

Bennett (1995), Diels and Pritzel (1904-5), Sainsbury (1991).





● *Conospermum eatoniae*



Locality Map

## *Conostephium minus* Lindl.

EPACRIDACEAE

Pink-tipped Pearl Flower

An erect shrub up to 60 cm tall. The leaves are linear, to 2 cm long, with revolute margins, clustered towards the ends of the branches. The flowers are solitary, in the axils of the upper leaves. They have pedicels less than 2 mm long, which become recurved so that the flowers are held horizontally or nodding. The flower is surrounded by overlapping bracts and sepals from which the end of the purplish-red corolla tube projects. It is broadest in the middle, tapering at both ends.

At the northern end of the species range the plants are taller, with longer leaves and flowers. Further taxonomic work is required.

**Flowering Period:** July-September

### **Distribution and Habitat in the Moora District**

Known from several populations in the metropolitan area, extending north into the Moora District as far as Badgingarra.

Grows on grey or yellow sandy soils of the coastal plain, usually in banksia woodland.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. S of Badgingarra	D	MRWA Road Verge	14.8.1991	1	Undisturbed
2.*Koojan	Mo	-	20.9.1976	-	-
3. N of Cataby	D	National Park	12.6.1988	-	-
4. NW of Regans Ford	D	Nature Reserve	10.9.1988	-	-
5. E of Cataby	D	Private	16.9.1988	-	-

### **Response to Disturbance**

Regenerates after fire.

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

Presumed susceptible

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

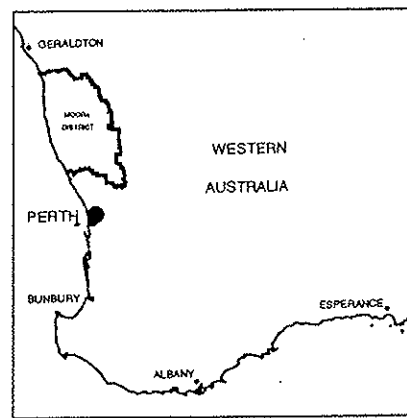
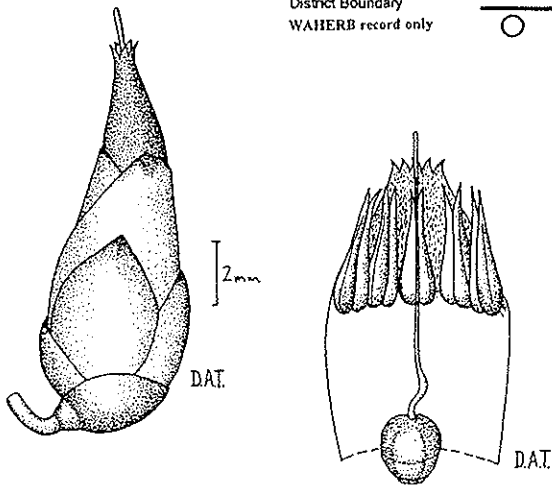
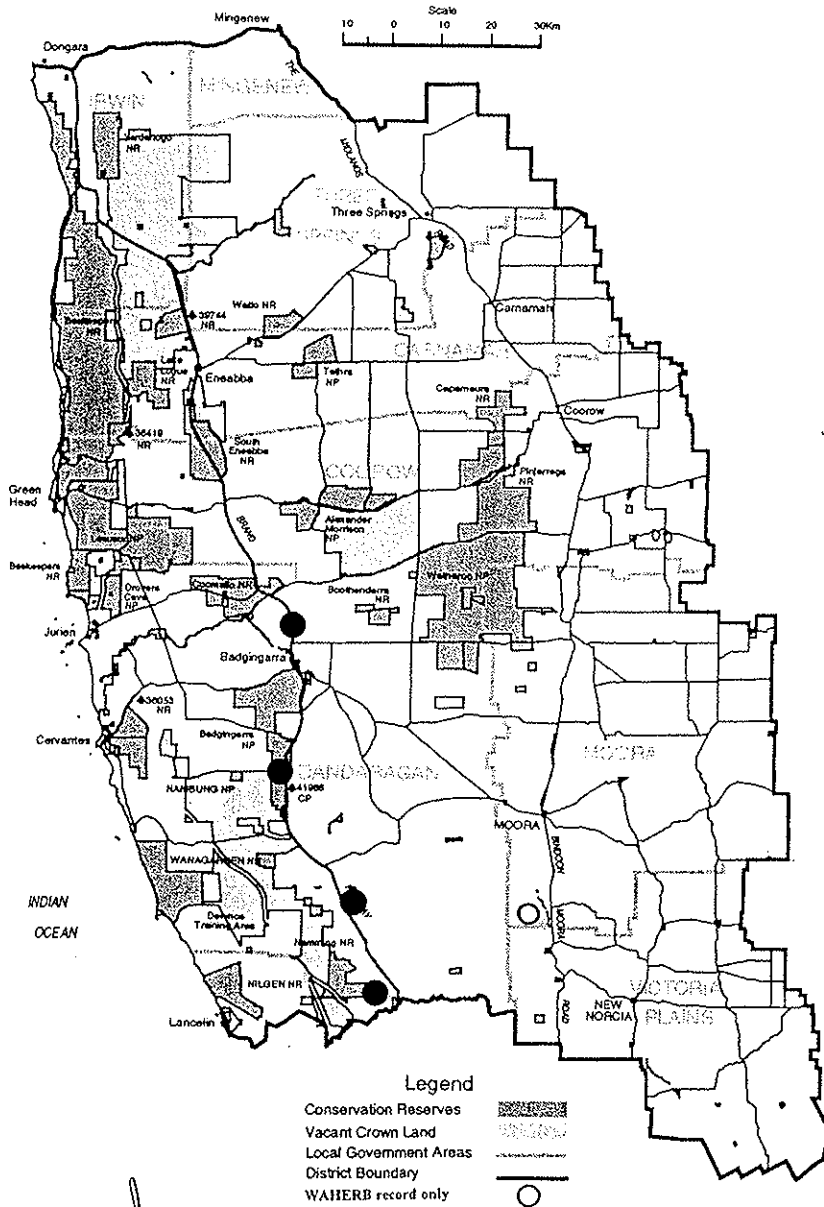
### **Research Requirements**

- Further survey is required, particularly to re-find populations 2-5 and complete full surveys.
- Further taxonomic research is required to elucidate differences between the populations at the north of the range and those further south.

References

Kelly *et al.* (1993), Marchant *et al.* (1987).

● *Conostephium minus*



Locality Map

## *Cryptandra nudiflora* F.Muell.

RHAMNACEAE

Wedge-leaved Cryptandra

A low shrub about 30 cm tall with spreading branches which are rigid and with short branchlets sometimes ending in spines. The leaves are linear-cuneate, with a broad apex, sometimes bilobed, and tapering towards the base. They are up to 12 mm long. The flowers are clustered along the branches on pedicels ca. 3 mm long. The calyx is tubular, the short lobes and tube glabrous, ca. 4 mm long. It is deep pink in colour, bell-shaped, as long as the five hooded petals. The disc and ovary are glabrous.

**Flowering Period:** July-September

### **Distribution and Habitat in the Moora District**

This species was originally collected from Port Gregory and the Murchison River and is known from several populations in the Geraldton District in the Northampton to Port Gregory area. However, the species has been collected twice from the Moora District in the Koojan area, south of Moora. There are no records of the habitat in which it was found in the Moora District. Near Northampton it grows in shallow clay loams or sandy clay, often associated with sheet granite, in winter-wet areas, growing amongst low heath.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* S of Koojan	VP	-	17.8.1978	-	-
2.* Near Koojan	VP	-	9.9.1969	-	-

### **Response to Disturbance**

Unknown

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

Unknown

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

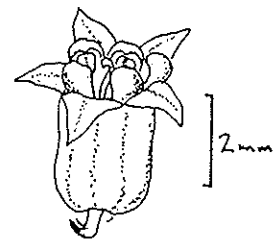
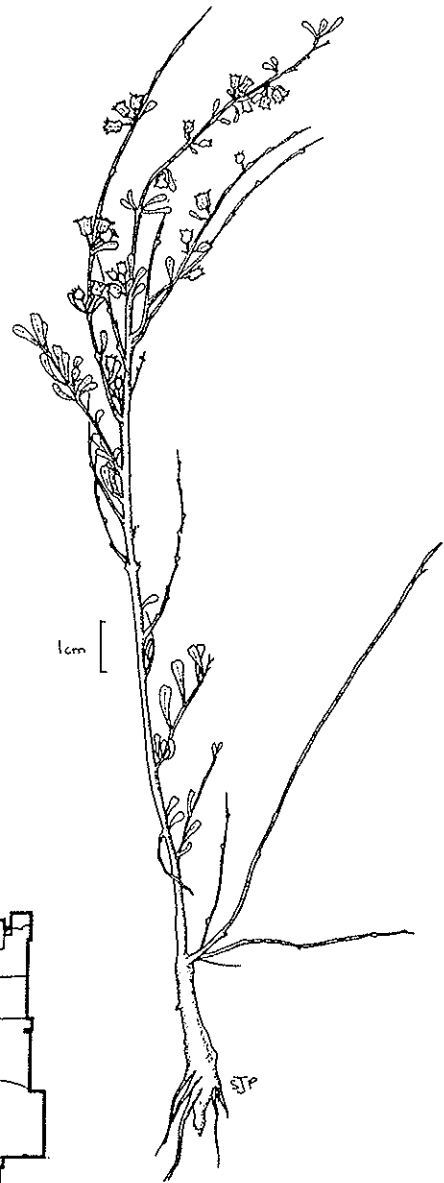
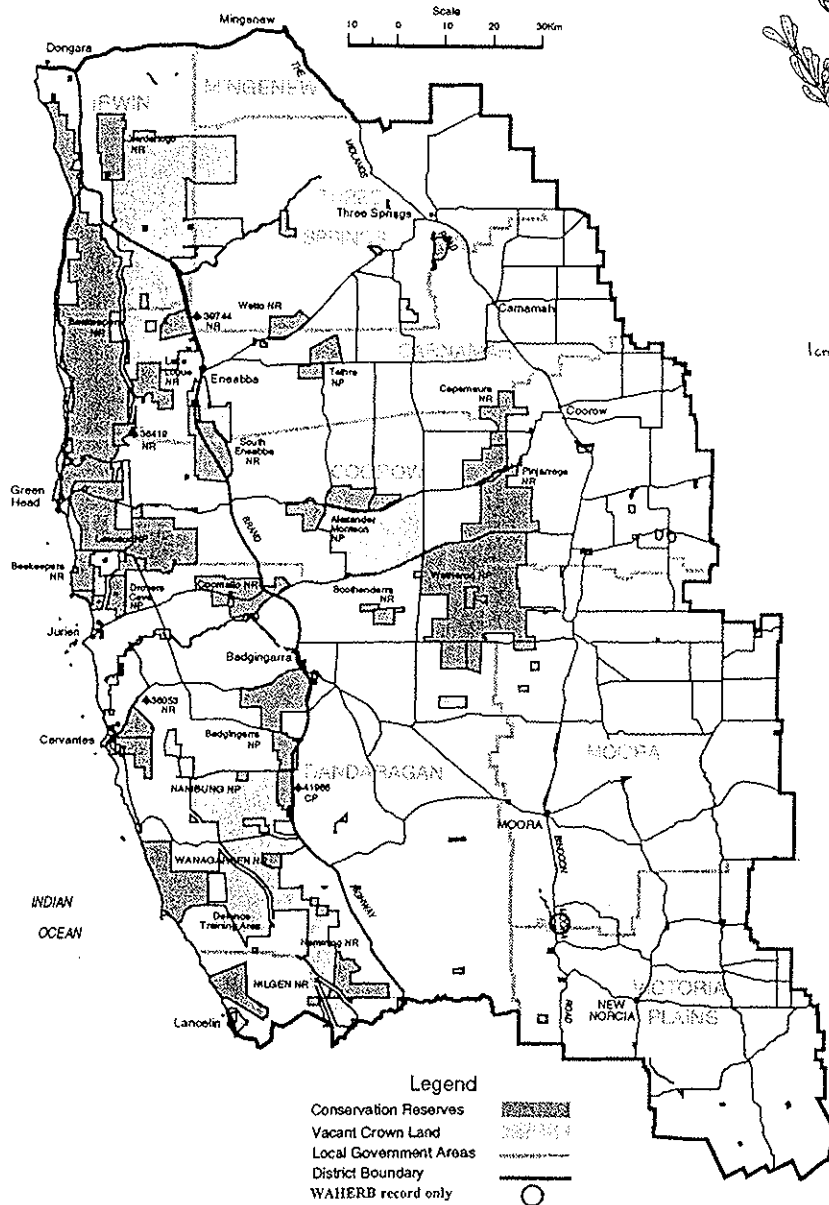
### **Research Requirements**

- Further survey is required in the District for this species.

### **References**

Bentham (1863), Blackall and Grieve (1985).

*Cryptandra nudiflora*



## *Daviesia epiphyllum* Meisn.

FABACEAE

Staghorn Bush

A spreading leafless shrub to 1 m tall. The stems are flat, broadly winged and glaucous. They are pinnately lobed with triangular to lanceolate, pungent lobes and are up to 2 or 3 cm broad. The flowers are in few-flowered clusters on the branches. The calyx has short, broad teeth and the flowers are scarlet to orange-scarlet in colour, to 2 cm or more in length. The pod is triangular in shape, ca. 2 cm long with a long pungent point.

**Flowering Period:** May-July

### Distribution and Habitat in the Moora District

This species is endemic to the Moora District, occurring in the Lesueur area and Gairdner Range, north to Eneabba, south to Badgingarra and east to the Boothendarra area, a range of ca. 50 km.

Grows on lateritic uplands, sometimes above breakaways, in pale brown loam or sandy clay or white sand in scrub, or low heath often with emergent mallees, including *Eucalyptus drummondii*, *E. gittinsii*, *Calothamnus* species and *Dryandra* aff. *falcata*.

### Conservation Status

Current: Priority 3

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. S of Eneabba	Ca	Nature Reserve	28.8.1991	1	Disturbed
2. E of Mt Lesueur	D	Private	1991	20	Undisturbed
3. NE of Badgingarra	D	Shire Road Verge	29.4.1992	1	Undisturbed
4. Mt Peron	Co	National Park	26.4.1993	Frequent-WH	-
5. Coomallo	D	Nature Reserve	18.11.1992	10+	Undisturbed
6. Cadda Road	D	Shire Road Verge	30.5.1994	10+	Growing on and around gravel scrape
7. N of Cockleshell Gully	Co	Gravel Reserve	19.6.1989	1+	At edge of gravel scrape
8. SE of Mt Lesueur	D	Shire Road Verge	10.1990	10-20	-
9.* SW of Mt Lesueur	D	-	24.7.1969	-	-
10.* Brand Highway	Co	-	30.5.1980	-	-
11.* Mt Lesueur	D	National Park	22.7.1962	-	-

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

### Management Requirements

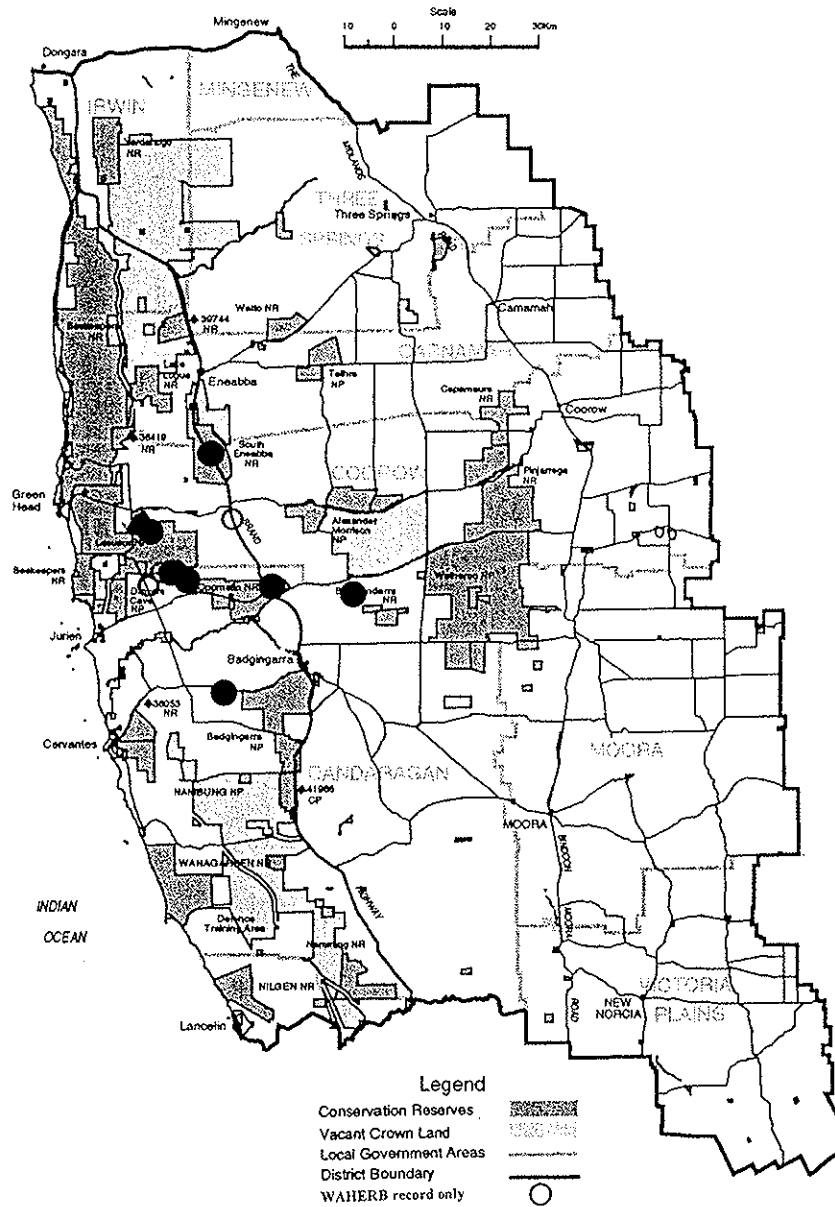
-- Ensure that dieback hygiene procedures are carried out at all populations.

## Research Requirements

- Further survey is required, particularly in the Lesueur National Park. The species is probably under-collected owing to its winter flowering period.

## References

Bentham (1864), Blackall and Grieve (1985), Crisp (1995).



● *Daviesia epiphyllum*

*Desmocladius elongatus* L.A.S.Johnson & B.G.Briggs ms

RESTIONACEAE

[*Loxocarya elongata*, *Loxocarya* sp. (B.Briggs 7481), *Loxocarya* sp. C]

An erect, tufted, rhizomatous sedge to 35 cm high. It is usually glabrous, but sometimes with hairs. The leaves are yellow-brown in colour, reduced and scale-like, 15-20 mm long, enclosing a cluster of leaf-like branchlets. The branchlets are often curved, 30-60 mm long. The flowering spikelets are 7-10 mm long, the male inflorescences broader than those of the female inflorescences and paler in colour.

**Flowering Period:** August-November

**Distribution and Habitat in the Moora District**

Occurs from Eneabba south to Dandaragan.

Grows in grey to white sand with laterite, or red-brown sandy clay over laterite, on slopes and uplands in heath.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Coomallo	D	MRWA Road Verge	14.8.1991	1	Undisturbed
2. W of Dandaragan	D	Shire Road Verge	2.7.1992	5+	Partly disturbed
3. Alexander Morrison	Co	Shire Road Verge	5.11.1992	5+	Partly disturbed
4. N of Badgingarra	D	Shire Road Verge	6.11.1992	23	Partly disturbed
5. NE of Badgingarra	D	Shire Reserve	10.12.1992	5+	Undisturbed
6. S of Eneabba	Co	Nature Reserve	9.12.1992	10+	Partly disturbed
7. E of Eneabba	Ca	National Park	5.11.1992	10+	Undisturbed
8. S of Eneabba	Co	MRWA Road Verge, Gravel Reserve	9.12.1992	50+	Some disturbance
9.* S of Hill River	D	-	25.9.1976	-	-
10.* S of Badgingarra	D	-	2.9.1970	Common-WH	-
11. Eneabba	-	-	10.1987	Common in 1984-WH	-
12. Badgingarra	D	Townsite Reserve	23.9.1988	-	-
13. Boothendarra Road	D	Shire Road Verge	7.11.1988	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

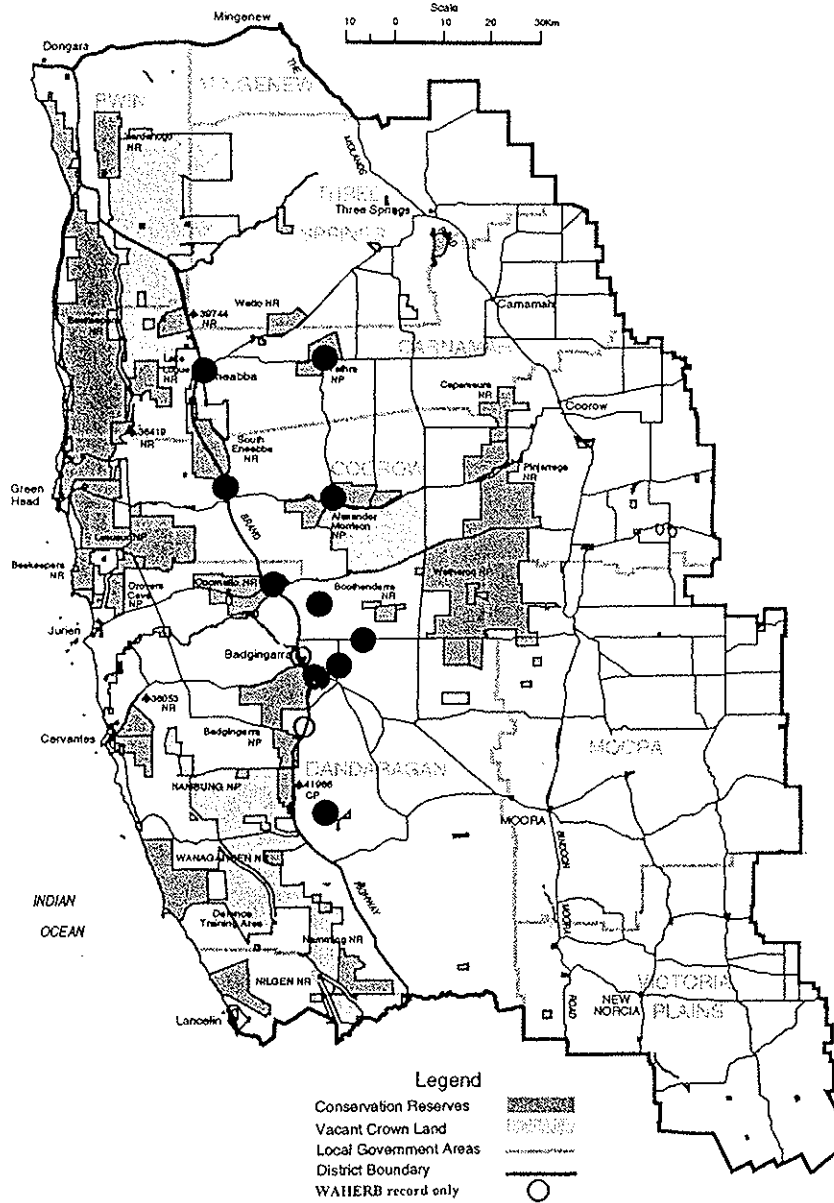
**Research Requirements**

- Further survey is required.



## References

Marchant *et al.* (1987).



● *Desmocladius elongatus ms*

*Desmocladus gigas* L.A.S.Johnson & B.G.Briggs ms

RESTIONACEAE

[*Restio gigas* ms]

A clumped, rhizomatous perennial herb 2-2.5 m tall and up to 1 m in diameter, with many erect stems. The leaves are soft and finely divided. The male and female inflorescences are borne on separate plants. The female inflorescences are ca. 2 cm long, surrounded by several broad, grey-brown bracts with long pungent points and edged with white woolly hairs. The male inflorescences are numerous, in long compound panicles, each ca. 1 cm long, brown in colour.

**Flowering Period:** September-November

**Distribution and Habitat in the Moora District**

Has been recorded over a narrow range of ca. 25 km in an area between Eneabba and Badgingarra.

Grows in grey or pale brown lateritic sand, emergent from low heath, sometimes in open low woodland of *Eucalyptus tottiana*.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Brand Highway	Co	MRWA Road Verge	6.11.1992	60	Some disturbance
2. N of Tootbardi Road	Co	Private	10.1992	-	-
3. N of Badgingarra	Co	National Park, Shire Road Verge & VCL	8.11.1991	500+	Undisturbed

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

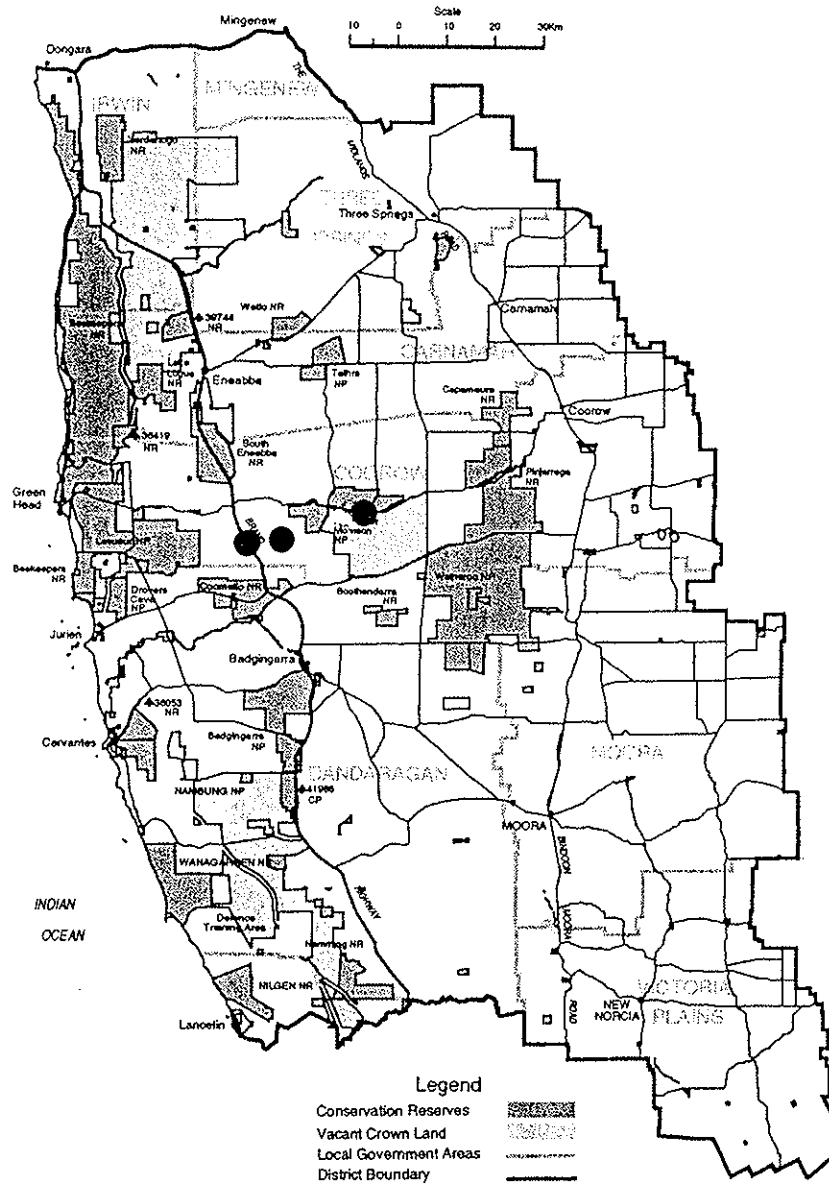
Unknown

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required.



● *Desmocladius gigas ms*

*Dryandra echinata* A.S.George

PROTEACEAE

[*Dryandra* sp. 7 (A.S.George 11703) [aff. *polycephala*]]

A spreading, much-branched shrub to 3 m tall, without a lignotuber. The branches are spreading. The leaves are dark green and dull on the upper surface and pale beneath. They are narrow, 3-15 cm long, 6-15 mm wide with 9-25 triangular lobes on each side. The flower heads are crowded towards the ends of the branches. The bracts are narrow, rusty brown at the apex, and pale below. Each inflorescence is small, less than 4 cm in diameter. The perianth is pale yellow, 17-23 mm long, the limb dark yellow, glabrous or with a few hairs near the base. The pistil is 22-26 mm long, glabrous except for a few hairs on the ovary.

The specific name refers to the prickly habit of the plant. *Dryandra echinata* is related to *D. polycephala* but is smaller and more compact, with broader leaves with larger lobes and larger flowers.

**Flowering Period:** July-September

**Distribution and Habitat in the Moora District**

This species occurs mainly in the south of the Moora District between Regans Ford and New Norcia, extending south into the Swan Region, where it occurs on a nature reserve north of Gingin with a population of ca. 150 plants and also in the Moore River National Park to the west of Wannamal. A population was recorded from much further north near Badgingarra in 1985.

Grows in lateritic gravel, clay loam or grey sand over laterite in low heath.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. W of Mogumber	D	Shire Road Verge	24.11.1993	1+	On edge of road on very narrow verge
2. NE of Regans Ford	D	Nature Reserve	25.9.1991	100+	Undisturbed
3. NE of Regans Ford	D	Nature Reserve	8.8.1991	1+	In restored quarry
4. E of Regans Ford	G	Shire Road Verge	30.7.1991	110+	Above road cutting, some plants dead
5. E of Regans Ford	G	Shire Road Verge	30.7.1991	5	Road edge, damaged by grading
6. E of Regans Ford	G	Private	11.2.1994	22	Healthy
7.* New Norcia	VP	-	20.7.1920	-	-
8.* S of Mogumber	VP	-	1977	-	-
9.* Between New Norcia and Gillingarra	VP	-	16.9.1973	-	-
10.* NE of Gillingarra	VP	Shire Road Verge	31.7.1983	-	-
11.* N of New Norcia	VP	-	9.1954	-	-
12. S of Dandaragan	D	Private	9.9.1988	-	-
13. N of Badgingarra	Co	National Park	1985	-	-

**Response to Disturbance**

Unknown

## Susceptibility to *Phytophthora* Dieback

Presumed susceptible

## Management Requirements

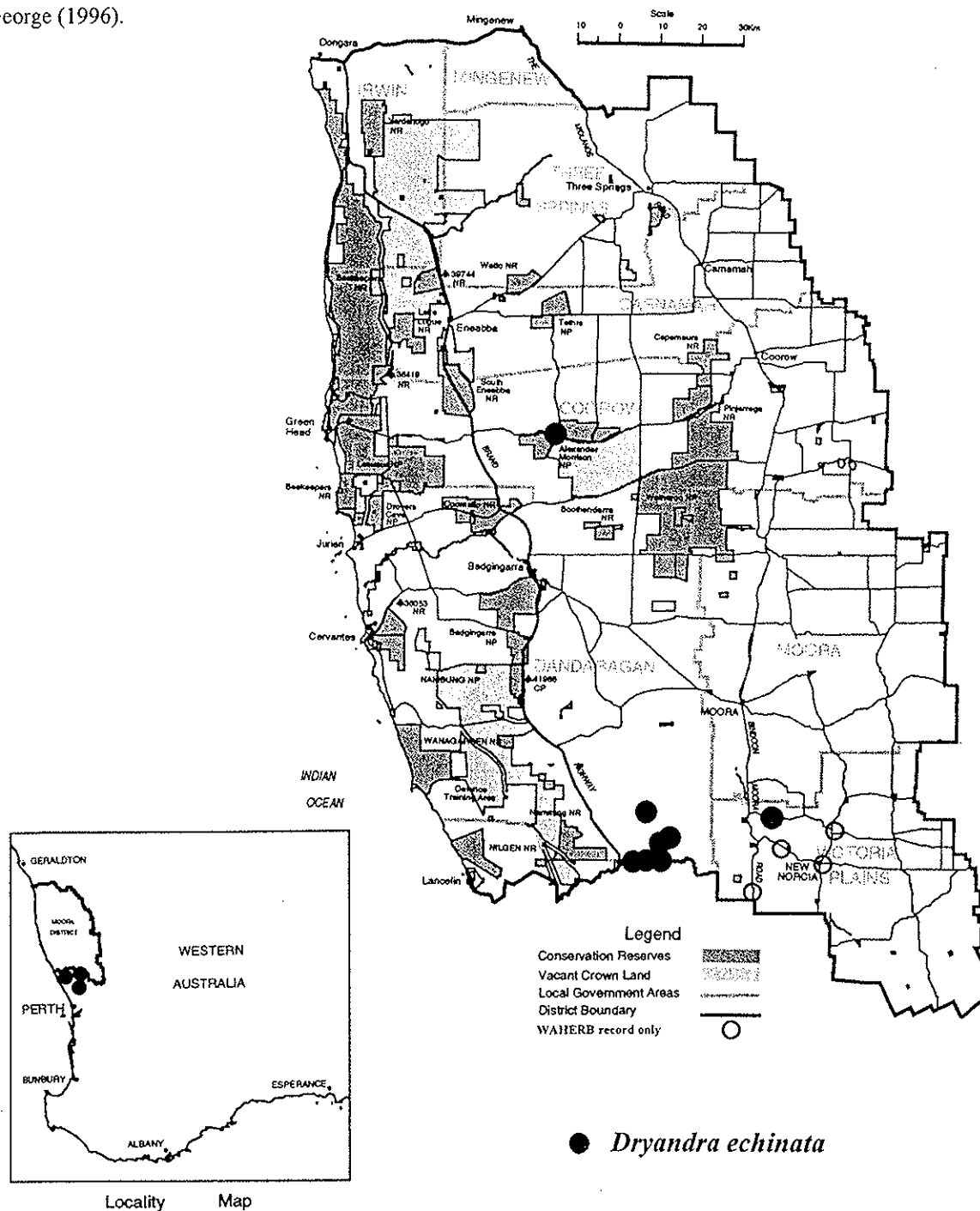
- Ensure that dieback hygiene procedures are carried out at all populations.

## Research Requirements

- Further survey is required.

## References

George (1996).



*Dryandra pteridifolia* R.Br. subsp. *vernalis* A.S.George

PROTEACEAE

[*Dryandra* sp. 22 (A.S.George 16779)]

Tangled Honeypot

A low shrub, forming clumps to ca. 40 cm with prostrate, underground stems. The leaves are 50-120 mm wide, pinnately divided almost to the midrib into linear segments with the leaf margins strongly rolled back, obscuring the lower surface. The involucral bracts are broadly ovate, the inner ones to 20 mm long, with obtuse apices. They are stiff and tomentose, rusty red in colour. The flowers are cream and pale gold in colour. The perianth is ca. 39 mm long. The pistil is 40-45 mm long and the pollen presenter is ca. 8 mm long.

Differs from the typical subspecies, which occurs on the south coast, in the leaf lobes, which are not twisted, the flowers, which are slightly larger, and in the flowering period, which is in spring, rather than in autumn. The subspecific name refers to the flowering period.

**Flowering Period:** September-October

**Distribution and Habitat in the Moora District**

Occurs from south of Eneabba to just north of the Moore River.

Grows in sandy loam or grey sand over lateritic gravel in low heath or mallee heath. Associated species include *Eucalyptus drummondii*, *Dryandra* species and *Hibbertia hypericoides*.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Tootbardie Road	Co	-	25.9.1994	-	-
2. Marchagee Track	Co	Shire Road Verge	28.7.1994	20-30	-
3. S of Dandaragan	D	Nature Reserve	2.10.1988	-	-
4.* Dandaragan	D	-	8.1958	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

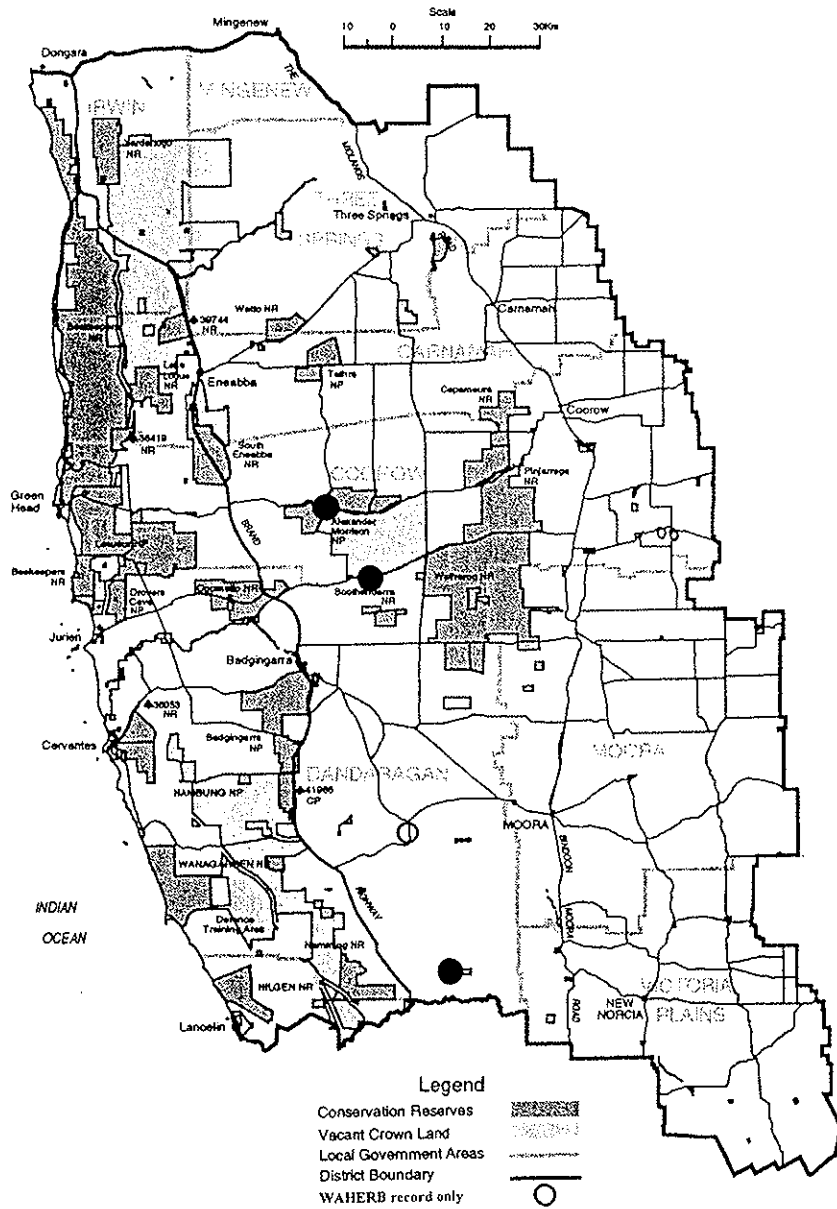
- Populations 1 and 3 should be refound and fully surveyed.
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required.

References

George (1996), Griffin (1985).



● *Dryandra pteridifolia* subsp. *vernalis*

*Dryandra speciosa* Meisn. subsp. *macrocarpa* A.S.George

PROTEACEAE

Shaggy Dryandra

An erect, bushy shrub 1 to 2 m in height with tomentose branches. The leaves are very narrow, and linear, 5-10 cm long, with the margins closely revolute and without lobes. The flower heads are pendulous, on the upper branches and are surrounded by long narrow bracts with hairy margins, 40-50 mm long. The flowers are pale yellow to pinkish-brown, the perianth is 24-30 mm long.

*Dryandra speciosa* subsp. *speciosa* occurs near Tammin and has 85-115 flowers in the head, and the follicles are 18-21 mm long. *D. speciosa* subsp. *macrocarpa* A.S.George occurs in the Moora District and has 65-75 flowers in the head and has larger follicles, 24-25 mm long.

Plants in the Moora District tend to flower later, the flowers are more yellow than orange-red, the bracts are narrower and the leaves are reticulate and hairy. The separation of these subspecies is based on the number of flowers in the inflorescence and fruit size, rather than the other differences which are not consistent.

**Flowering Period:** June-August

**Distribution and Habitat in the Moora District**

Grows in the Moora District between Eneabba and Badgingarra over a range of ca. 60 km and also occurs near Tammin.

Grows in gravelly sand over laterite in heath or mallee heath with *Eucalyptus gittinsii*.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Tathra	Ca	National Park	9.10.1991	-	-
2. Marchagee Track	Co	Shire Road Verge	14.8.1991	1+	Moderate
3. Alexander Morrison	Co	National Park	14.8.1991	1+	Undisturbed
4. Marchagee Track	D	Shire Road Verge	29.4.1992	1+	-
5. Dewar Road	D	Shire Road Verge	29.4.1992	-	-
6. Boothendarra	D	Nature Reserve	29.4.1992	1+	Undisturbed
7. E of Willis Road	Co	National Park	6.8.1992	1+	Undisturbed
8.* Willis Road	Co	-	5.8.1986	-	-
9.* Tootbardie Road	Co	National Park	19.5.1985	-	-
10.* NE of Eneabba	Ca	-	12.9.1978	-	-
11.* W of Coorow	-	-	30.6.1967	-	-
12.* NW of Dinner Hill	-	-	26.6.1965	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible



### Management Requirements

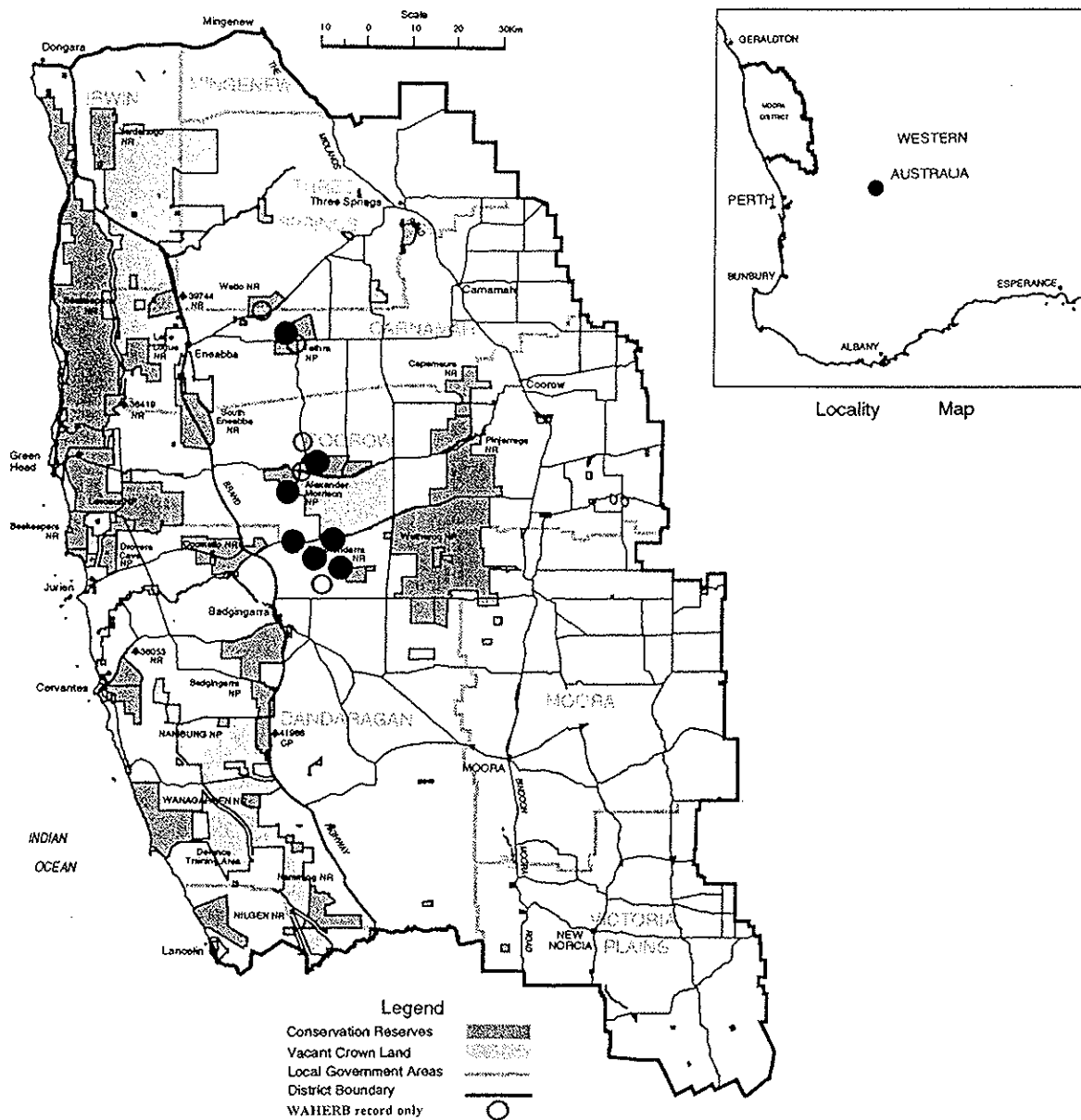
- Although the species in the Moora District appears to be well represented in conservation areas, the status of the subspecies in the Tammin area should be reconsidered.
- Ensure that dieback hygiene procedures are carried out at all populations.

### Research Requirements

- Further survey is required.

### References

George (1996), Griffin (1985), Mollemans *et al.* (1993), Sainsbury (1985).



● *Dryandra speciosa subsp. macrocarpa*

## *Dryandra tortifolia* Kippist ex. Meisn.

PROTEACEAE

*Dryandra tortifolia* is a dwarf shrub 15-25 cm tall with leaves 10-20 cm long, divided into awl-shaped lobes which are twisted so that the upper half of the blade is held somewhat horizontally. The flowers are large and terminal. The receptacle is convex, with the flowers arising in a circle around a central hole, and with more than 20 flowers in the head. The perianth is hairy but not sticky. The pistil is not hooked and is longer than the perianth with a narrow pollen presenter. The fruit is a woody follicle.

This species has been included for many years under the name *D. nivea* and the early name has only recently been brought back into use (George 1996).

Similar to *D. actotidis*, *D. tortifolia* has narrower leaf lobes, which are more rigid and less white-coloured beneath, and are turned so that the upper face is horizontal. The flowers are larger and the style and stigma are thicker.

Bentham considered this species to be a variety of *D. arctotidis* which is geographically separate, growing in the Stirling Range area.

**Flowering Period:** October-November

### **Distribution and Habitat in the Moora District**

Occurs from Eneabba to Cataby, where it grows on white, grey or yellow sand over laterite, sometimes on uplands. It is found in low open heath, sometimes beneath open, low woodland of *Eucalyptus calophylla*.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. NW of Cataby	D	Conservation Park	13.9.1993	5+	Undisturbed
2. E of Lesueur	D	-	10.10.1985	-	-
3. Cadda Road	D	-	1.8.1983	-	-
4. W of Badgingarra	D	National Park	6.10.1981	-	-
5.* S of Eneabba	Co	Nature Reserve	9.10.1981	-	-
6.* Cockleshell Gully	D	-	8.10.1978	-	-
7.* S of Eneabba	Ca	-	2.8.1977	-	-
8.* S of Eneabba	Ca	-	27.4.1977	-	-

### **Response to Disturbance**

Unknown

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

Presumed susceptible

### **Management Requirements**

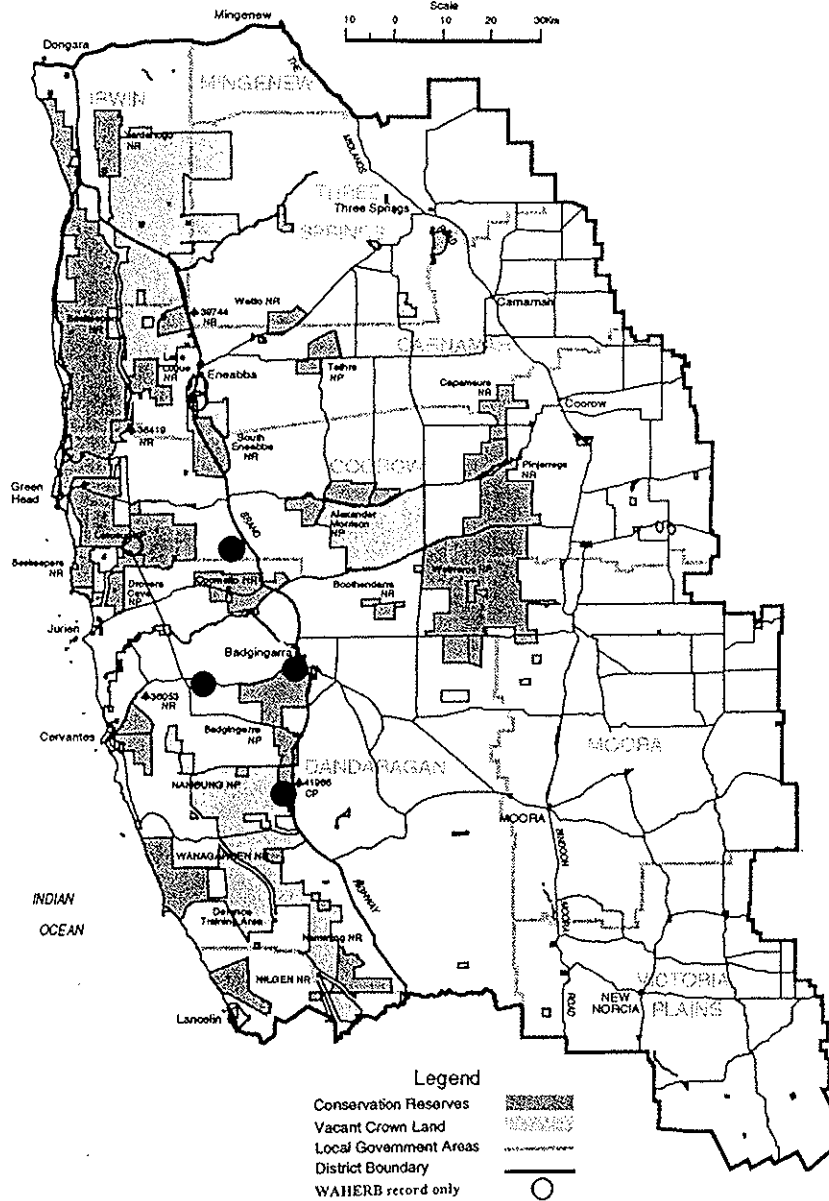
- Ensure that dieback hygiene procedures are carried out at all populations.

## Research Requirements

- Further survey is required, particularly in the Lesueur National Park where it has been reported from several populations.

## References

Bentham (1870), Blackall and Grieve (1988), George (1996), Griffin (1985), Hooker (1855).



● *Dryandra tortifolia*

***Eucalyptus foecunda* Schauer in Lehm.  
subsp. Coolimba (M.I.H. Brooker 9556)**

MYRTACEAE

A mallee to 4 m tall, with smooth grey bark, ribboning for 2 m from the base, with pale yellow-brown bark beneath. The leaves are shining, to 10 x 1.2 cm with a dense fine vein network. There are up to 11 buds in each inflorescence, the stamens strongly inflexed within the bud. The bud caps are distinctly beaked. The fruits are barrel-shaped, with a short stalk, a thick rim and a whitish disc, which is level to descending. The fruits are 0.6 cm long and 0.4-0.5 cm wide.

Similar to *Eucalyptus foecunda* which differs in its conical to slightly beaked opercula, and thin, rough bark. It is recognised as a local variant of *E. foecunda*.

**Flowering Period:** Unknown

**Distribution and Habitat in the Moora District**

Known from four populations over a 7 km range on the coastal dunes north of Coolimba, where it grows in white sand over limestone in low heath with *E. zopherophloia* and *Melaleuca huegelii*.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Coolimba	Ca	Reserve for flora protection and apiculture	11.5.1989	Scattered plants over 1.5 km	-
2. N of Coolimba	Ca	-	21.11.1986	-	-
3. N of Coolimba	I	-	21.11.1986	-	-
4. N of Coolimba	Ca	Reserve for flora protection and apiculture	16.3.1989	-	Regeneration from fire

**Response to Disturbance**

Resprouts after fire.

**Susceptibility to *Phytophthora* Dieback**

Presumed not susceptible

**Management Requirements**

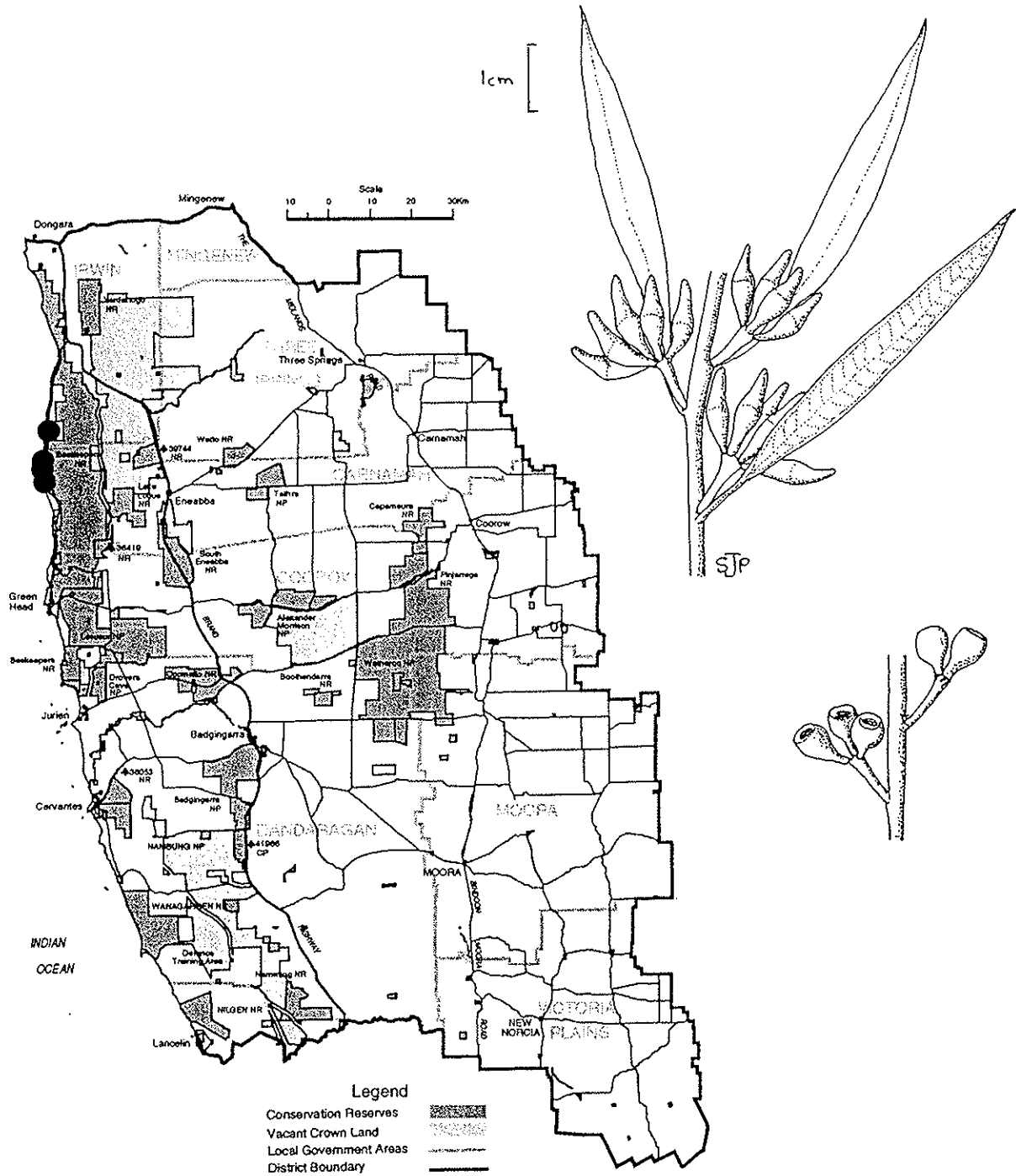
- Ensure that road maintenance operations and fire regimes do not damage the plants.
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required to record the full extent of the taxon which is thought to occur only locally at the northern end of the range of *E. foecunda*.

References

Kelly *et al.* (1995), Napier *et al.* (1988a).



● *Eucalyptus foecunda* subsp. *Coolimba* (M.I.H. Brooker 9556)

## *Grevillea asparagoides* Meisn.

## MYRTACEAE

An intricately branched, lignotuberous shrub, prostrate or erect, 0.5 to 2 m tall. The leaves have short petioles and are two or three times divided into narrow-linear, pungent segments and are up to 3.5 cm long. The margins are revolute so that the lower surface has two grooves. Both leaves and flowers are glandular hairy. The inflorescences are pendulous and terminal, with brownish floral bracts. The flowers have pedicels 5-14 mm long. Each flower is pink to red in colour and the torus is straight. The style is glandular hairy and the ovary is pubescent. The pollen presenter is oblique and rounded. The fruit has reddish markings.

This species is similar to *Grevillea batrachioides* which has sessile leaves.

**Flowering Period:** July-September

### Distribution and Habitat in the Moora District

This species is known from a few collections in the Perenjori area in the Geraldton District south to Wubin and Wongan Hills in the Merredin District. One population of 900 plants is known from the boundary of the Moora District east of Bindi Bindi and the species has also been recorded in the past from south of Bindi Bindi and east of Piawaning.

Grows in yellow or white sandy loam and gravel in heath and low shrubland with scattered eucalypts or in heavy clay.

### Conservation Status

Current: Priority 3

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. E of Bindi Bindi	Mo	Shire Road Verge	22.8.1990	900	Disturbed
2.* S of Bindi Bindi	Mo	Shire Road Verge	10.10.1986	1	-
3. E of Piawaning	-	-	-	-	-

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

### Management Requirements

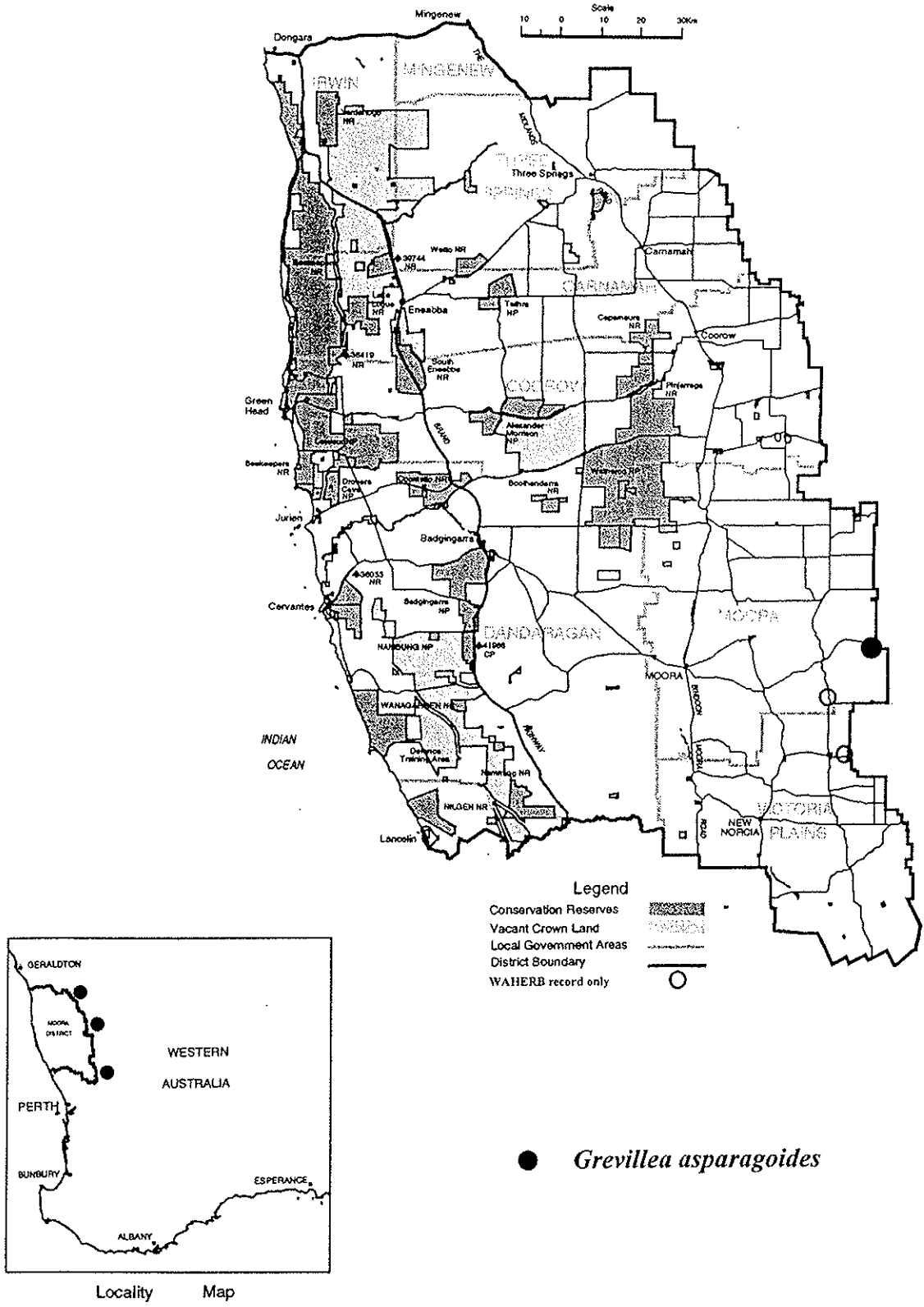
- Monitor the known population regularly.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Further survey.

### Research Requirements

- Urgent further survey is required as the population in the Moora District is the only one which has been surveyed recently.

References

Blackall and Grieve (1988), McGillivray (1993), Mollemans *et al.* (1993), Olde and Marriott (1995).



## *Grevillea leptopoda* McGill.

PROTEACEAE

A dense, spreading, prickly shrub to 1.5 m tall, with spreading branches. The leaves are 4-8 cm long, divided into three leaflets which are divided again into three. The lobes are narrowly linear, 1-3.5 cm long and ca. 1 mm wide. The flowers are grouped in terminal, branched inflorescences, 4-6 cm long. The perianth is creamy-white with some pink on young buds. It is ca. 3 mm long, glabrous on the outside and hairy at the base on the inner surface. The pistil is 7.5-9 mm long and is glabrous. The pollen presenter is oblique, convex to obliquely conical. The fruit is 9-10.5 mm long, slightly wrinkled.

Similar to *Grevillea teretifolia*, which has a shorter flower spike, ca. 2 cm long, longer pistil, 10-17 mm long and a beard on the inner perianth surface, which is more prominent in the upper half. Also confused with *G. intricata* which has a prominent, erect stigmatic cone.

**Flowering Period:** July-September

### **Distribution and Habitat in the Moora District**

Occurs from Coorow to Arrino in the Moora District extending to north-east of Mingenew in the Geraldton District and with a disjunct occurrence at Kalbarri.

Grows in gravelly sandy loam or grey sand with gravel in low heath.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Three Springs	TS	Shire Road Verge	27.1.1994	40+	Area disturbed
2. W of Three Springs	TS	Shire Road Verge	2.10.1990	Frequent-WH	-
3.* NW of Three Springs	TS	-	1.9.1973	-	-
4.* 50 miles N of Moora	Co	-	6.9.1962	-	-
5.* Coorow-Carnamah	-	-	25.9.1962	Common on wasteland-WH	-
6.* NW of Carnamah	Ca	-	18.7.1953	-	-
7.* Three Springs	TS	-	9.1940	-	-

### **Response to Disturbance**

Regenerates from seed after fire.

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

Presumed susceptible

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

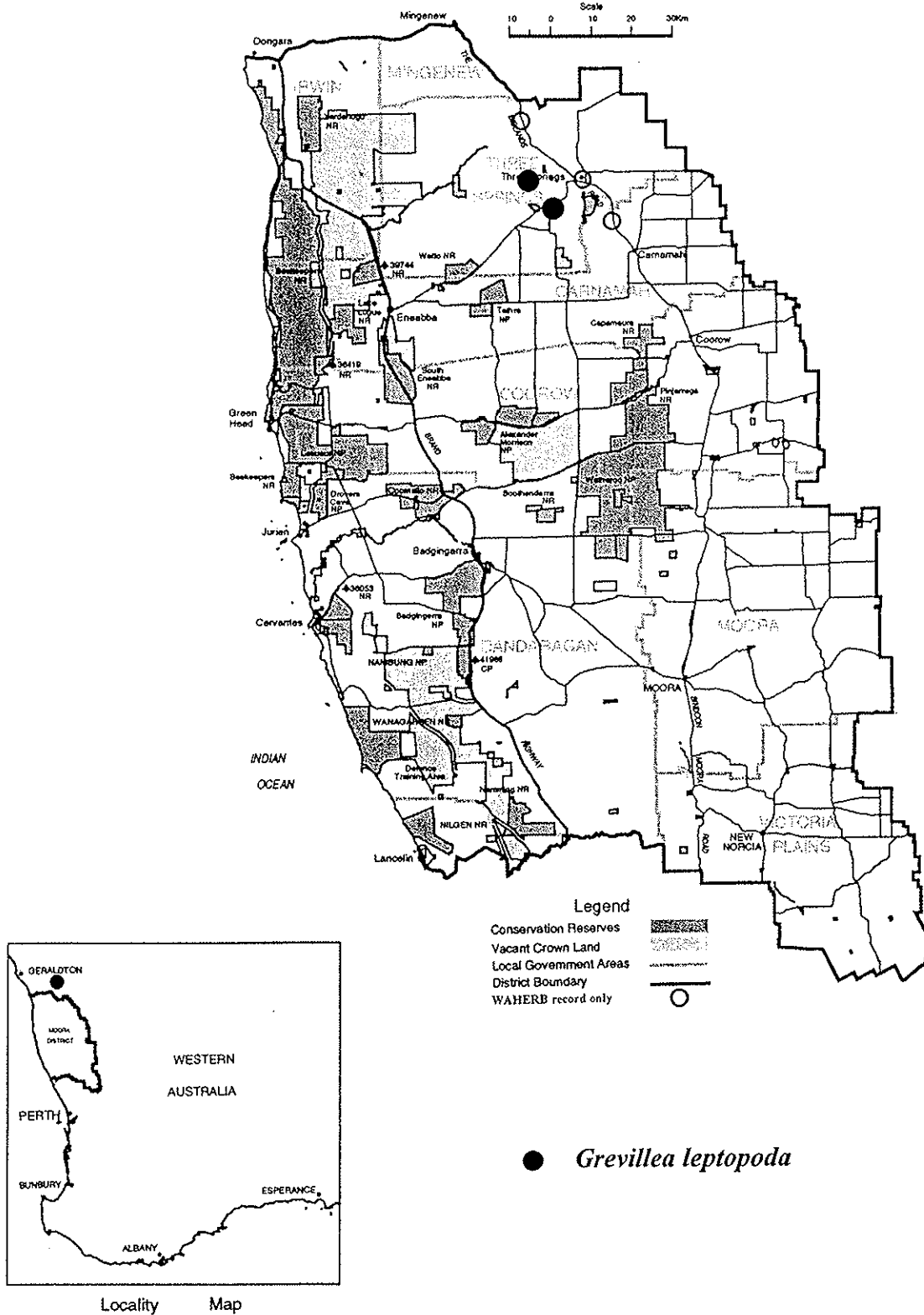
### **Research Requirements**

- Further survey is required.



References

McGillivray (1993), Olde and Marriott (1995).



## *Grevillea spinosissima* McGill.

PROTEACEAE

A shrub to 1.5 m tall with densely hairy branchlets. The leaves are rigid and three times divided with very pungent lobes. The flowers are white and glabrous, with broad, conical style ends. The fruits are hairless and ridged.

**Flowering Period:** June-October

### **Distribution and Habitat in the Moora District**

Known from the Wongan Hills area in the Merredin District, south to Quairading and York. Two populations have been recorded in the past from the Moora District, from near Marchagee and an early record possibly from north of Eneabba.

The species grows in clay, sand or sandy loam or gravel, in heath, scrub or woodland of *Allocasuarina huegeliana*.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.*S of Marchagee	Co	-	4.10.1982	-	-
2.*W of Three Springs	TS	-	27.8.1948	-	-

### **Response to Disturbance**

Growth appears to be stimulated by disturbance.

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

Presumed susceptible

### **Management Requirements**

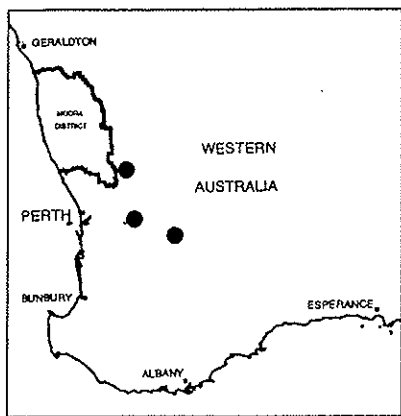
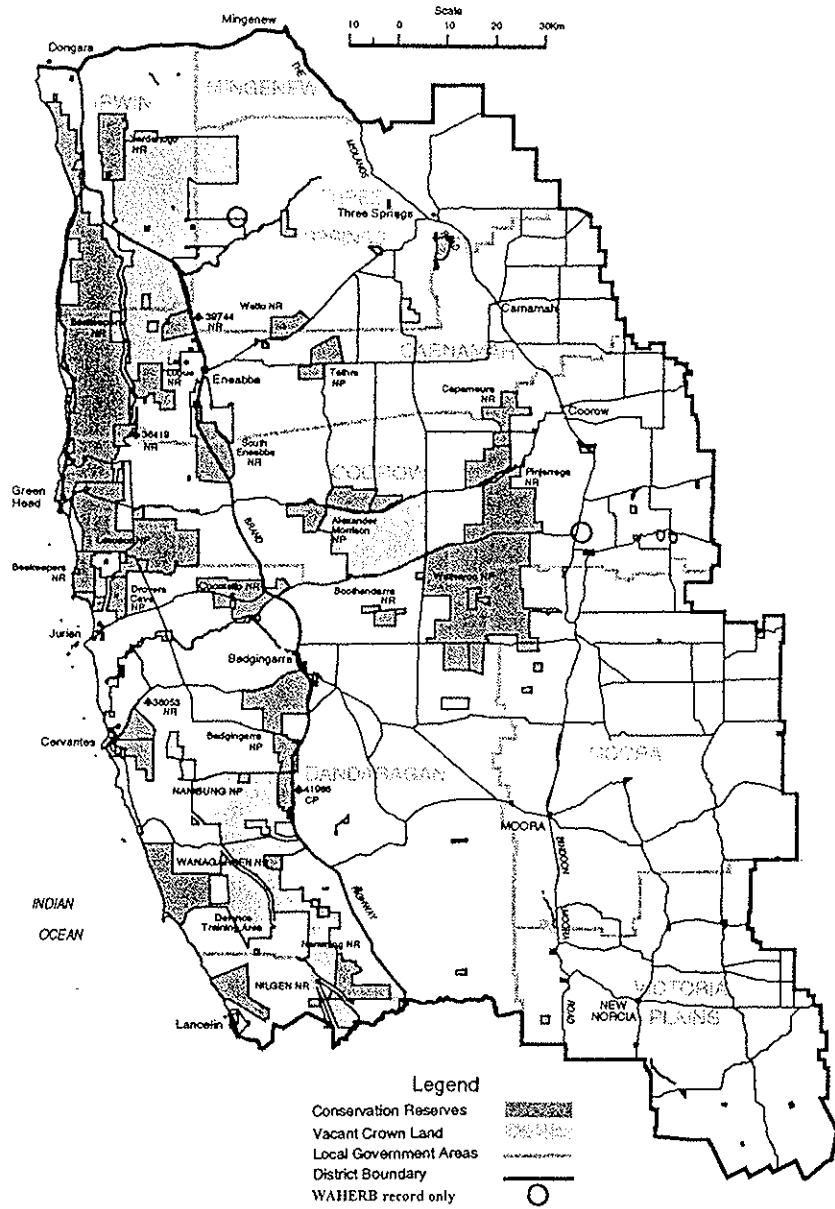
- Ensure that dieback hygiene procedures are carried out at all populations.

### **Research Requirements**

- Further survey is required in the Moora District.

### **References**

McGillivray (1986), Mollemans *et al.* (1993), Olde and Marriott (1995).



Locality Map

● *Grevillea spinosissima*

## *Grevillea thyrsoides* Meisn. subsp. *thyrsoides*

PROTEACEAE

A low, prostrate shrub to 0.7 m tall and up to 3 m in diameter. The leaves are up to 11.5 cm long, divided into erect lobes 9-65 mm long and 1-1.5 mm wide. The inflorescence is branched and erect, terminal on trailing peduncles. The perianth is pink to red, longitudinally ribbed and hairy on the outside. The pistil is 24-33 mm long, with a stalk beneath the ovary 1-2.8 mm long.

The pollen presenter is oblique and convex, the style including the end is hairy. The fruit is compressed, 14-18 mm long, with reddish-brown blotches and stripes.

Differs from subspecies *pustulata* in that most leaves are more than 5 cm long, and the leaf lobes lack a prominent basal protuberance on the undersurface.

**Flowering Period:** June-October, December

### Distribution and Habitat in the Moora District

Occurs from Badgingarra to Cataby, where it grows on grey sand and lateritic gravel often on midslopes of lateritic uplands in heath or mallee heath.

### Conservation Status

Current: Priority 3

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. W of Dandaragan	D	Nature Reserve	18.9.1993	10+	Undisturbed
2. NW of Dandaragan	D	Private	11.8.1988	-	-
3. Badgingarra Road	D	Shire Road Verge	28.9.1988	-	-
4. SW of Cataby	D	-	10.2.1988	Uncommon-WH	-
5. Badgingarra Road	D	Shire Road Verge	31.8.1984	Common-WH	-
6.* SE of Cataby	D	Shire Road Verge	9.9.1981	Scattered but frequent-WH	-
7.* S of Cataby Creek	D	-	3.8.1976	-	-
8.* Jurien Bay Road	D	-	13.12.1958	-	-

### Response to Disturbance

Regenerates from seed.

### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

### Management Requirements

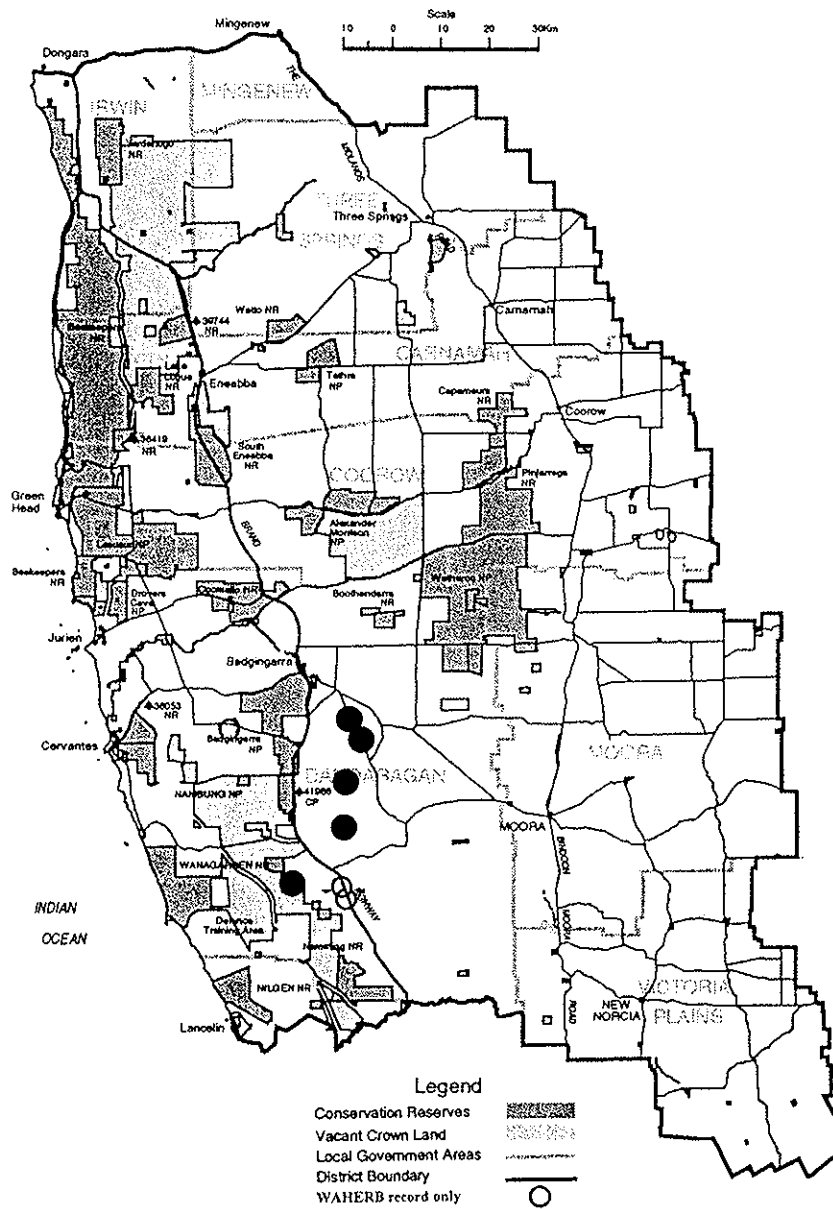
- Ensure that dieback hygiene procedures are carried out at all populations.

### Research Requirements

- Further survey is required.

References

McGillivray (1986), Olde and Marriott (1993, 1995).



● *Grevillea thyrsoidea* subsp. *thyrsoidea*

*Grevillea uncinulata* Diels subsp. *florida* McGill.

PROTEACEAE

A scarcely-branched shrub to 1 m tall, with a few, upright, columnar branches. The leaves are simple, entire, 0.5-2 cm long, linear-lanceolate in shape, with the margins smoothly rolled under and the lower surface densely woolly. In the typical subspecies the lower surface is obscured. The flower heads are larger than those of the typical subspecies, the pedicels are longer, 10-14 mm long. The flowers are hairy, creamy-white in colour, with a yellow, orange or red style end and the hairs extending onto the style end. The style end is larger than that of the typical subspecies, the pollen presenter with a small beak, 0.3-0.4 mm long.

The leaves are usually longer than those of the typical subspecies, in which they are 0.5-1(-3.5) cm long and which have prominent veins on the upper surface giving the leaf an angular appearance when the margins are rolled back, and in which the pedicels are less than 9 mm long. The leaf surface is granulose in both subspecies.

In the Hill River area there is a larger-leaved form, with pedicels ca. 9 mm long, but with the leaves 2-3.5 cm long. The leaves have the angular appearance of subsp. *uncinulata*, and this has therefore been assigned to this subspecies by McGillivray and Olde.

**Flowering Period:** July-September

**Distribution and Habitat in the Moora District**

Occurs south of the Moora District south of New Norcia where ca. 500 plants have been recorded on road verges over ca. 8 km extending north into the District from Mogumber to north-east of Gillingarra. Populations in the Dandaragan and Badgingarra area thought to be subspecies *florida* are now known to be a long-leaved form of subspecies *uncinulata*.

Grows in heath, sometimes beneath banksia or dryandra woodland, in sand and lateritic gravel.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

*Grevillea uncinulata* subsp. *florida*

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. S of New Norcia	VP	MRWA Road Verge	16.8.1990	2	Undisturbed
2. NE of Gillingarra	VP	Private	31.10.1990	-	-
3.* N of Mogumber	VP	-	5.9.1957	-	-

*Grevillea uncinulata* subsp. *uncinulata* long-leaved form

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Yandan	D	Nature Reserve, Shire Road Verge	30.7.1991	30+	Undisturbed
2. Tootbardie Road	C	Shire Road Verge	14.8.1991	20+	Partly disturbed
3. Minyulo Road	D	Shire Road Verge	13.8.1991	32	Partly disturbed
4. S of Tootbardie Road	D	MRWA Road Verge	14.8.1991	10+	Undisturbed

*Grevillea uncinulata* subsp. *uncinulata* long-leaved form (Cont'd)

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
5. Brand Highway	D	MRWA Road Verge	14.8.1991	35+	Undisturbed
6. Coomallo	D	Nature Reserve, MRWA Road Verge	14.8.1991	50+	Undisturbed
7. E of Jurien	D	Nature Reserve, MRWA Road Verge	14.8.1991	50+	Undisturbed
8. Pen Road	C	Shire Road Verge	6.8.1992	5+	Undisturbed

**Response to Disturbance**

Regenerates from seed.

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

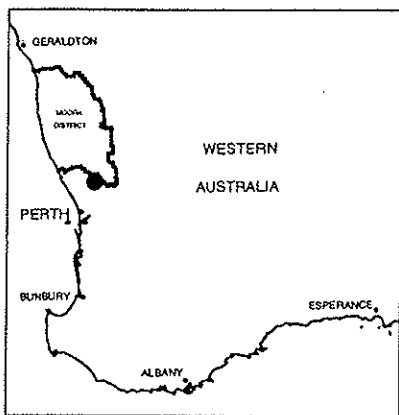
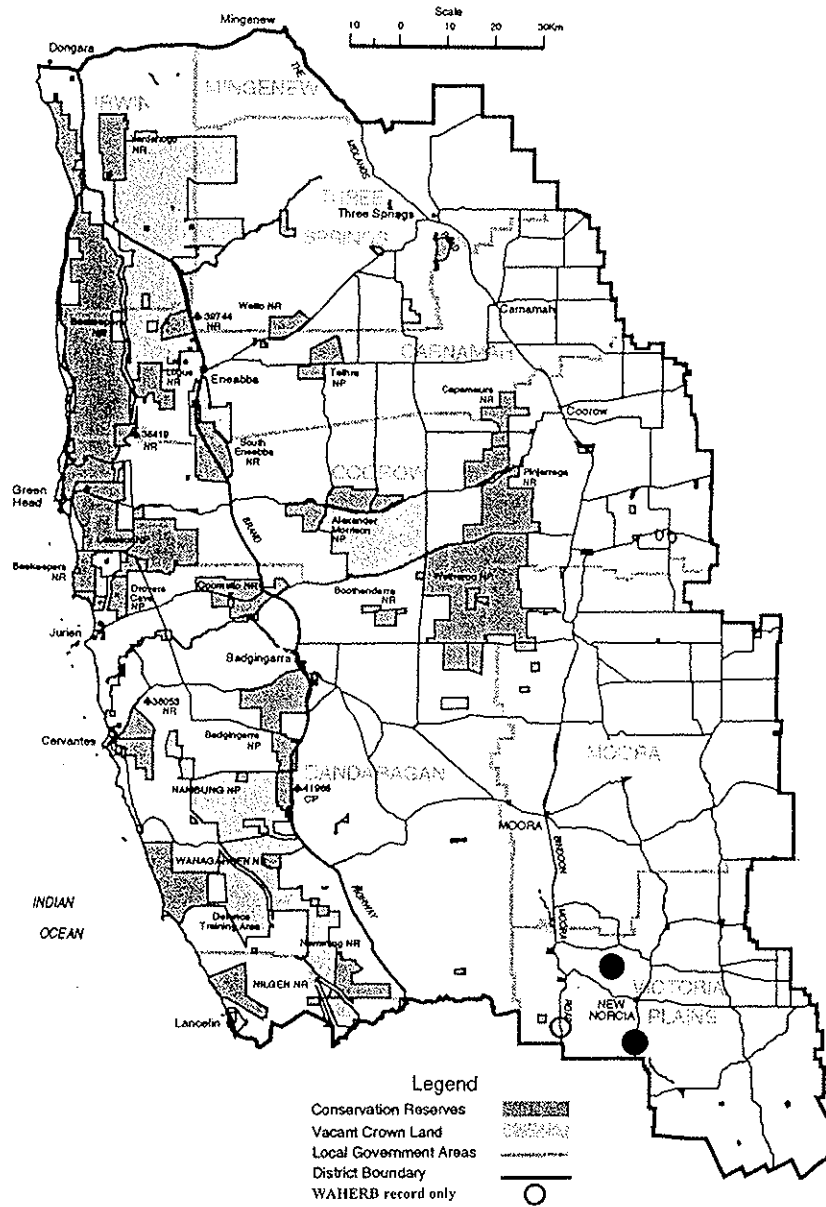
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required on conservation reserves in the south of the District.
- Further taxonomic research is required on the species, particularly to elucidate the relationship between *G. uncinulata* subsp. *florida* and the Hill River form of subspecies *uncinulata*.
- Further work is required on the populations the Hill River area which appear to fall into the description of the long-leaved form of subspecies *uncinulata*. This taxon should be considered for addition to the Priority Flora List as a Priority 3 taxon.

**References**

E. Griffin (personal communication), McGillivray (1986), Olde (1986), Olde and Marriott (1995).



Locality Map

● *Grevillea uncinulata* subsp. *florida*



***Grevillea uniformis* (McGill.) P.Olde & N.Marriott**

PROTEACEAE

[*Grevillea acrobotrya* subsp. *uniforma*]

A spreading, open shrub to 1.5 m high. The branchlets are glabrous to softly tomentose, the leaves tomentose to glabrous on lower surface, the venation prominent on the lower surface with the midvein and several lateral veins.

The ultimate leaf lobes are broadly triangular to subulate and less than 1.5 cm long. The leaves adjacent to the inflorescence are toothed or broadly lobed and similar to those on the lower parts of the plant. The floral bracts are deciduous when the bud is 0.5 mm long. The perianth is glabrous on the outside and the limb is subglobose in late bud, the style narrowly subcylindrical with a slight styler swelling. The pollen presenter is conical with the stigma narrower than the base of the pollen presenter, and the pollen presenter has a distinct basal rim. The pistil is 3-4 mm long, glabrous, as is the ovary. The fruit are smooth.

Differs from related species in the densely tomentose branchlets, similar shaped leaves on lower vegetative growth and flowering stems, with pungent toothed margins, lower surface densely hairy, perianth and pistil glabrous, the shape of the style and pollen presenter and the smooth fruit.

**Flowering Period:** July to November

**Distribution and Habitat in the Moora District**

Occurs from south-west of Eneabba to Jurien and east to Mt Lesueur.

Grows in exposed sandstone outcrops in crevices, beside creeklines in grey sand over brown loam, sand over laterite in open low heath and yellow sandheath.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Mt Lesueur	D	National Park	23.9.1992	20+	Undisturbed
2. Pen Road	Co	Shire Road Verge	18.12.1991	50 est.	-
3. Coorow-Greenhead Road	C	MRWA Road Verge	6.8.1992	20+	Undisturbed
4.* SW of Mt Lesueur	D	MRWA Road Verge	29.9.1976	20+	Undisturbed
5.* S of Eneabba	Ca	-	9.1977	-	-
6.* Cockleshell Gully	D	-	28.11.1974	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

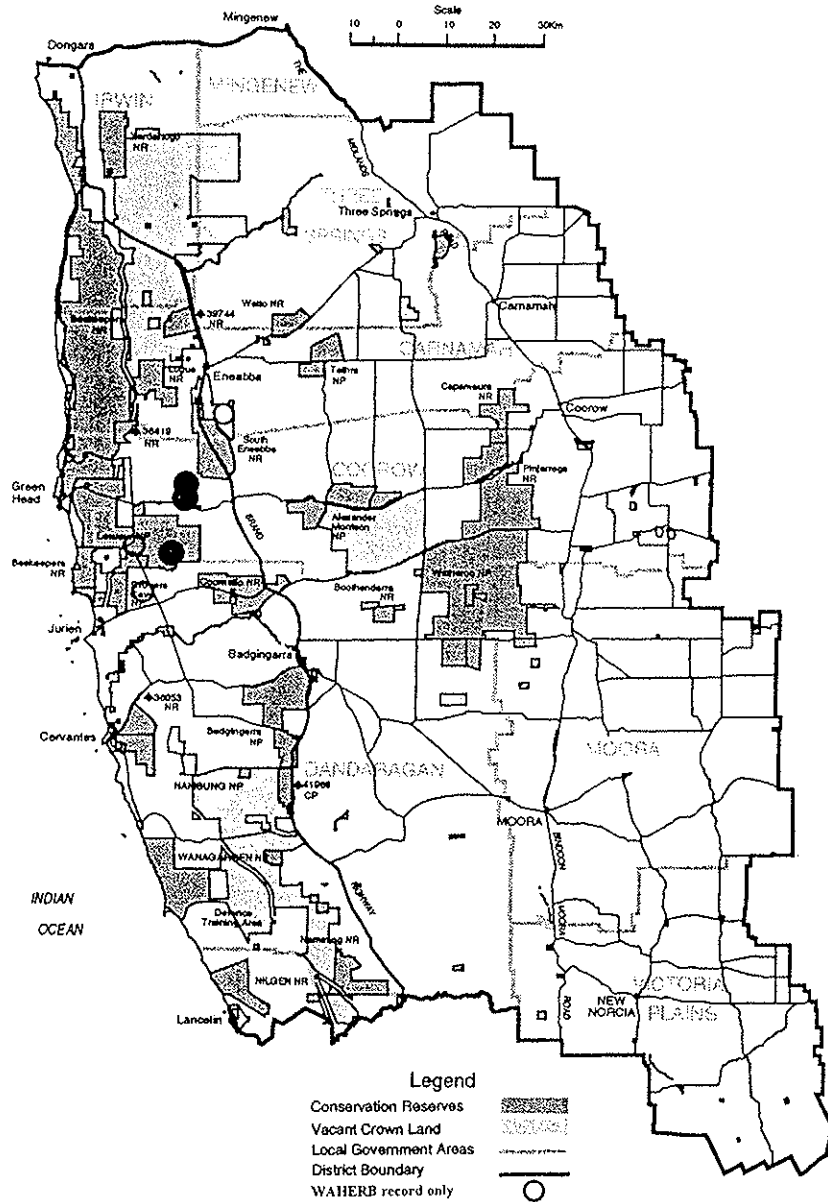
- Ensure that road verge populations are marked.
- Ensure that dieback hygiene procedures are carried out at all populations.
- Maintain liaison with Shire and MRWA.

## Research Requirements

- Further survey is required.

## References

McGillivray (1986), Olde and Marriott (1993, 1995).



● *Grevillea uniformis*

## *Guichenotia alba* Keighery

## STERCULIACEAE

This species was listed in Griffin *et al.* 1990 as *Guichenotia* sp. (E.A.Griffin 858) and was listed on the Declared Rare and Priority Flora List 1992 as *G. pallida* ms. First collected in 1938 by W.E. Blackall, it was not described until 1992 by G.J. Keighery after it had been collected and recognised as a new species during the W.A. Wildflower Society *Banksia* sandplain survey.

A spreading to prostrate, multistemmed shrub with stems to 40 cm long, the plant to 10 cm tall or stems more erect when growing entangled amongst dense shrubs. The leaves are up to 22 mm long with the margins rolled over and covered with stellate hairs when young. The stipules are leafy, half to two-thirds as long as leaves. The flowers are pendant, the calyx large, 11-13 mm long, white in colour, the lobes with three prominent ribs after flowering. There are small, scale-like petals. The style has a ring of stellate hairs below the stigma.

**Flowering Period:** July-August

**Fruiting Period:** November

### Distribution and Habitat in the Moora District

This species has been recorded from south of Dandaragan to south of Encabba over ca. 120 km, but not all populations have been refound recently. However this is an inconspicuous species, often growing entangled with other shrubs and may well still be present over this range. A collection made from Three Springs in 1940 suggests that the species has occurred and may still occur over much of the District.

Grows in low open heath on sandy clay, grey or yellow loamy sand and gravel, or grey sand over clay in winter-wet depressions. Associated species include *Hypocalymma angustifolium*, *Allocasuarina humilis* and *Hakea* species.

### Conservation Status

Current: Priority 3

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Twyata	D	Nature Reserve	15.8.1991	3	Undisturbed, partly burnt several years previously
2. N of Badgingarra	D	MRWA Road Verge	15.8.1991	1	Undisturbed
3. Mullering Brook	D	MRWA Road Verge	1.8.1991	1	Undisturbed
4.* Mimegarra Road	D	-	3.8.1976	-	-
5.* Three Springs	TS	-	26.8.1940	-	-
6.* Diamond of the Desert	-	-	26.8.1946	-	-
7.* N of Lesueur	C	?Private	7.8.1985	Occasional-WH	-
8. SE of Dandaragan	D	Private	10.9.1988	-	-
9.* E of Lake Indoon	Ca	-	10.7.1977	-	-
10. W of Mt Lesueur	D	National Park	1993	-	-

### Response to Disturbance

Plants were found on a previously disturbed area at population 10.

### Susceptibility to *Phytophthora* Dieback

Unknown, but thought to be high.

**Management Requirements**

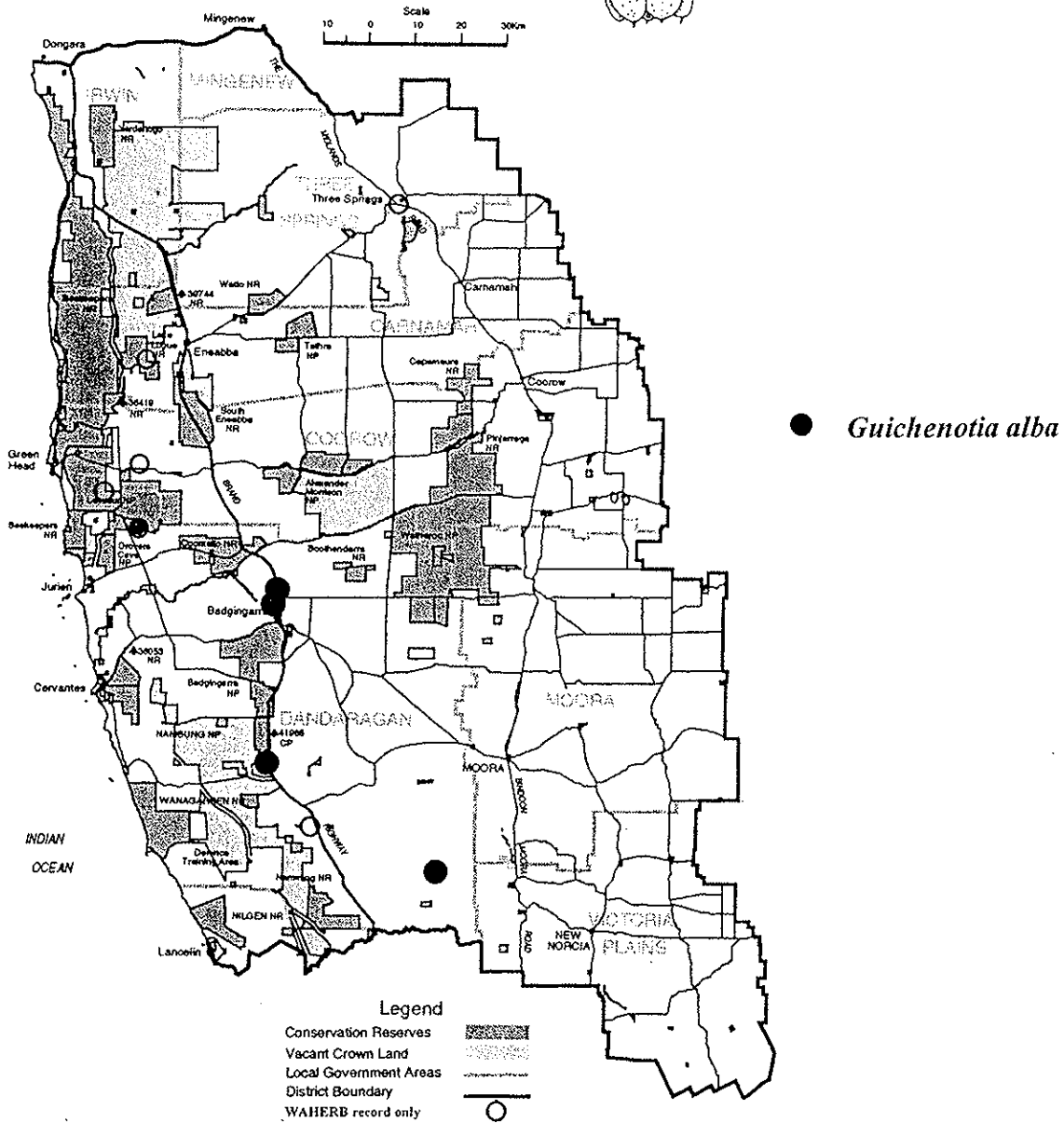
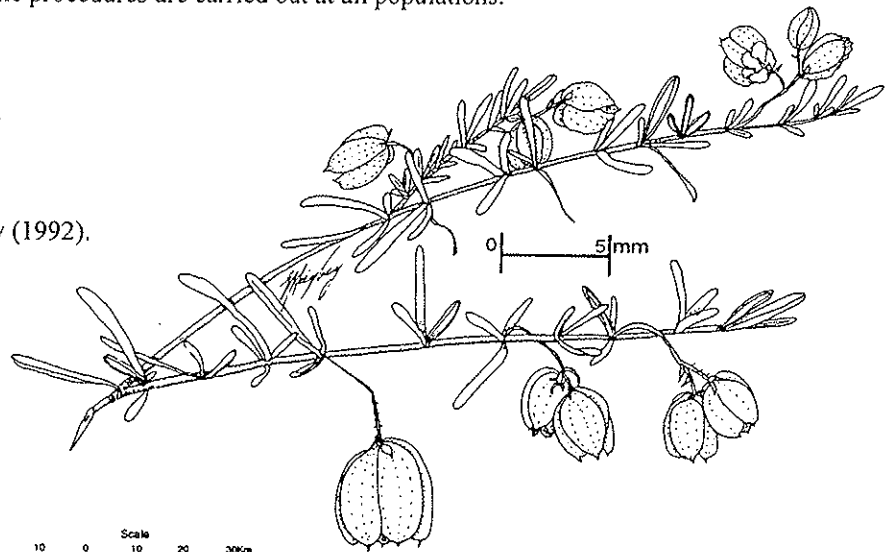
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required.

**References**

Griffin *et al.* (1990), Keighery (1992).



A bulbous, perennial plant 45 to 120 cm tall. There is usually only one basal leaf, occasionally two, with a blade 6-20 mm wide. The inflorescence is an open panicle of flowers in small clusters of 2-5. The margins of the bracteoles are broad and white, contrasting with the centre, which is dark and opaque. The flowers are 10-11.5 mm long, black, greenish or brownish-black in colour. The sepals are almost as long as the petals and the stamens are equal. The style is longer than the anthers and slightly shorter than the petals.

This species is distinguished by the combination of characters of only one or two basal leaves, leaf blade to 20 mm wide, bracteoles with broad white margins and an opaque, dark centre.

**Flowering Period:** September-November

#### Distribution and Habitat in the Moora District

Occurs in the Moora District from Eneabba to Regans Ford, and south into the Swan Region and metropolitan area.

Grows in grey or yellow sand in banksia woodland or in sandy gravel or lateritic loam on lateritic uplands in heath.

#### Conservation Status

Current: Priority 3

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* S of Eneabba	Ca	VCL (Mining Lease)	26.10.1978	-	-
2.* Regans Ford	D	Townsite Reserve	25.10.1982	-	-
3.* Mount Peron	D	National Park	17.10.1984	-	-
4. NW of Regans Ford	D	MRWA Road Verge	8.10.1991	-	-
5.* E of Jurien	D	Shire Road Verge	16.11.1984	-	-
6.* Regans Ford	D	Townsite Reserve	18.11.1988	-	-
7. Cantabilling Road	D	Shire Gravel Reserve	8.1.1992	1	Undisturbed
8. S of Mt Lesueur	D	National Park	1993	1	-

#### Response to Disturbance

The growing point has been observed to occur up to 25 cm below the soil surface and therefore may be unaffected by disturbance.

Several populations were found to be flowering soon after a fire, one had few flowering plants in an area burnt two years previously, but old inflorescences were present. It therefore appears to flower in the first year after a fire.

#### Susceptibility to *Phytophthora* Dieback

Unknown

#### Management Requirements

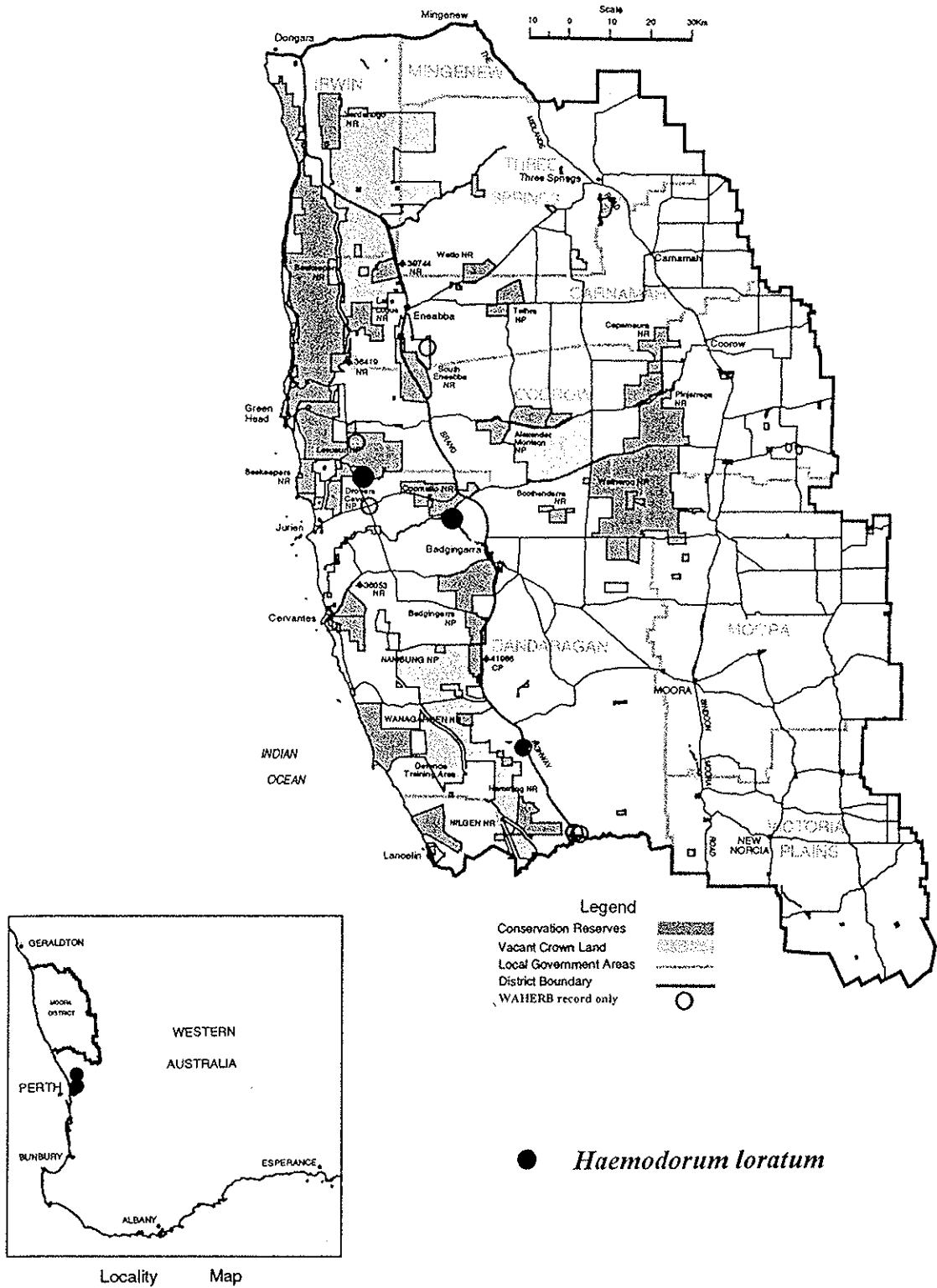
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required.

**References**

Macfarlane (1987).



● *Haemodorum loratum*

## *Hakea myrtoides* Meisn.

PROTEACEAE

### Myrtle Hakea

A low shrub from 0.6-1 m tall, semi-prostrate. The leaves are almost stalkless, elliptic, 10-22 mm long, with smooth margins, and a long pungent point. The flowers are in few-flowered clusters in the upper leaf axils, on short stalks. They are mauve to crimson in colour. The style is 12-14 mm long with an erect stigmatic disc. The fruit is a follicle 8-10 mm long, with a short curved beak and a rough surface.

**Flowering Period:** May-July

### Distribution and Habitat in the Moora District

This species is known from four populations in the Moora District, from south of Badgingarra to Calingiri. It also occurs further south at Wannamal and along the Darling Scarp and Ranges in the Perth area. There is also one record from near Brookton.

It grows in brown loam or clay, usually in shallow soils near granite in low heath or scrub, sometimes in open wandoo woodland.

### Conservation Status

Current: Priority 3

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SE of Calingiri	VP	Nature Reserve	9.9.1991	20+	Undisturbed
2. Waddington	VP	Townsite Reserve	5.1984	1	-
3. N of Mogumber	VP	Rail Reserve	8.1984	13	-
4. SE of Badgingarra	D	-	28.9.1988	-	-

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

### Management Requirements

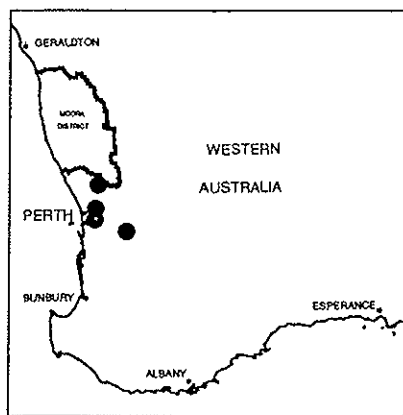
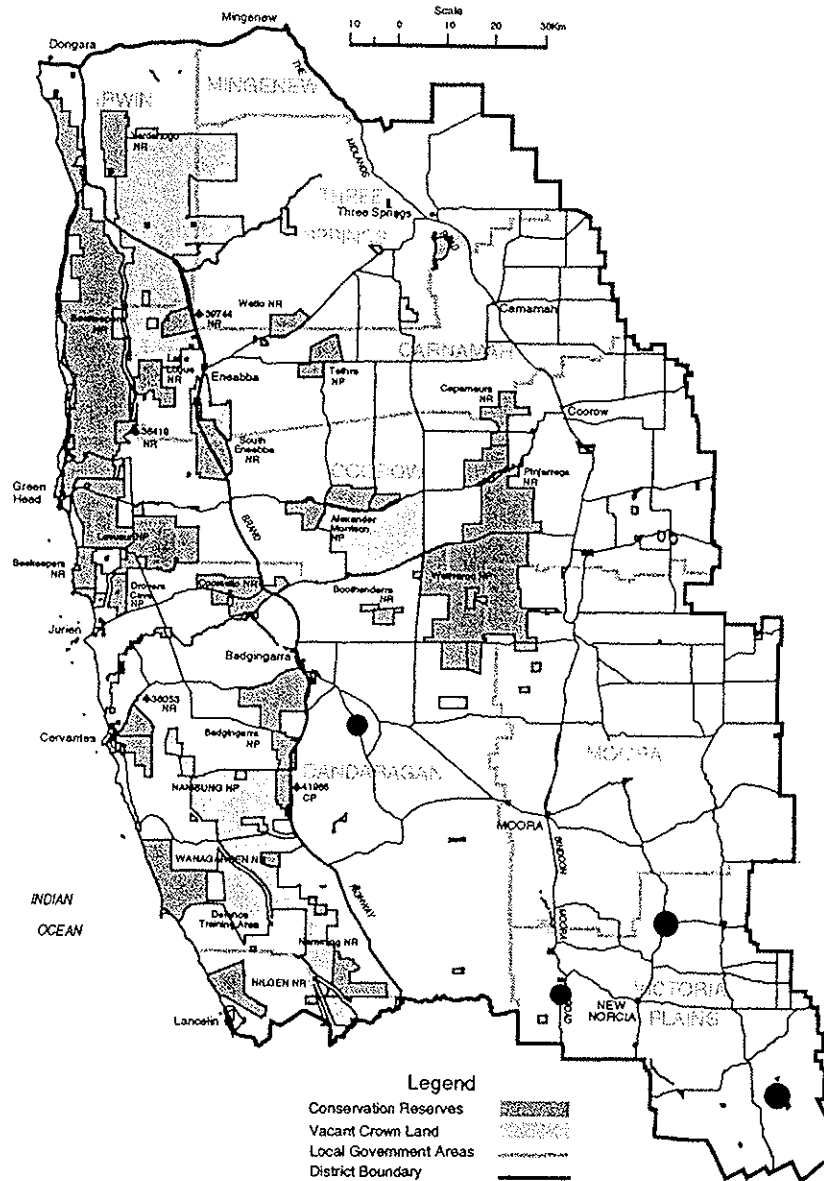
- Ensure that dieback hygiene procedures are carried out at all populations.

### Research Requirements

- Further survey is required. This species is very under-recorded in the Western Australian Herbarium and many reported populations outside the Moora District require revisiting for full survey and collection of voucher specimens.

### References

Marchant *et al.* (1987).



Locality Map

● *Hakea myrtilloides*



An erect shrub to 50 cm tall. The leaves are dentate, prickle-toothed, spathulate in shape, with a long winged base but without auricles. The leaves are all the same shape on the bush, green on the upper branches, the lower ones persisting but becoming brown. The flowers are found among the old, brown leaves. They are deep red in colour.

This species has been confused with *Hakea auriculata* but was recognised as a variety of that species by Benthham in 1870. *H. auriculata* has broad stem clasping auricles at the base of the leaf and the upper leaves may be reduced to three narrow, pungent pointed lobes. The flowers are greenish-white, cream or pink and are usually found amongst the tricuspidate leaves at the upper end of the branches.

**Flowering Period:** June-September

#### Distribution and Habitat in the Moora District

Endemic to the Moora District where it occurs from north of Eneabba to south of Dandaragan.

Grows in sand over laterite, or sandy loam or clay, usually in low heath or sometimes in very open eucalypt woodland with heath.

#### Conservation Status

Current: Priority 3

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. E of Regans Ford	D	Nature Reserve	25.9.1991	1	At edge of gravel scrape
2. E of Lake Logue	Ca	Nature Reserve	9.10.1991	1+	Undisturbed
3. W of Badgingarra	D	MRWA Road Verge	15.8.1991	2	Undisturbed
4. N of Mt Lesueur	D	National Park	6.10.1991	20+	Undisturbed
5. Mt Benia	D	Education Reserve	15.8.1991	4+	Undisturbed
6. Mimegarra Road	D	Shire Road Verge	11.9.1991	10	Undisturbed
7. Tootbardie Road	D	National Park, Shire Road Verge	14.8.1991	1 5+	Undisturbed
8. W of Dandaragan	D	Private	25.9.1991	50+	Undisturbed
9. N of Eneabba	I	VCL	8.11.1991	2	Undisturbed
10. Cantabilling Road	D	Shire Gravel Reserve	8.1.1992	1	Undisturbed
11. Marchagee Track	Co	Shire Road Verge, VCL	29.4.1992	5+	Undisturbed
12. Pen Road	Co	Shire Road Verge	6.8.1992	20+	Undisturbed
13. Pen Road	Co	Shire Road Verge	6.8.1992	20+	Undisturbed
14. Coorow Greenhead Road	Co	MRWA Road Verge	6.8.1992	2	Undisturbed
15. E of Eneabba	Ca	MRWA Road Verge	6.8.1992	5+	Partly disturbed
16. N of Mt Lesueur	D	National Park	23.9.1992	5+	Undisturbed
17. Shaw Road	Co	Shire Road Verge	18.11.1992	10+	Undisturbed
18. S of Jurien Road	D	Nature Reserve	21.10.1992	5+	Undisturbed
19. Watheroo West Road	D	Shire Road Verge	20.10.1992	1	Undisturbed
20. Coomallo	D	Nature Reserve	18.11.1992	5+	Undisturbed
21. Banovich Road	D	Shire Road Verge	18.11.1992	30+	Undisturbed
22. NW of Cataby	D	VCL	15.9.1993	30+	Undisturbed
23. E of Eneabba	Ca	Shire Road Verge	19.8.1993	1+	Undisturbed
24. NW of Cataby	D	VCL (Mining Lease)	13.9.1993	10+	Healthy

## Populations Known in the Moora District (Cont'd)

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
25.* SE of Badgingarra	D	Private	1991	-	-
26.* SE of Badgingarra	D	Private	1991	-	-
27.* Mullering Road	D	Private	1991	-	-
28.* Mullering Brook	D	Private	1991	-	-
29. E of Cataby	D	Water Reserve	28.6.1988	-	-
30. S of Mimegarra Road	D	Gravel Reserve	10.7.1988	-	-
31.* N of Dandaragan	D	-	19.8.1949	-	-

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

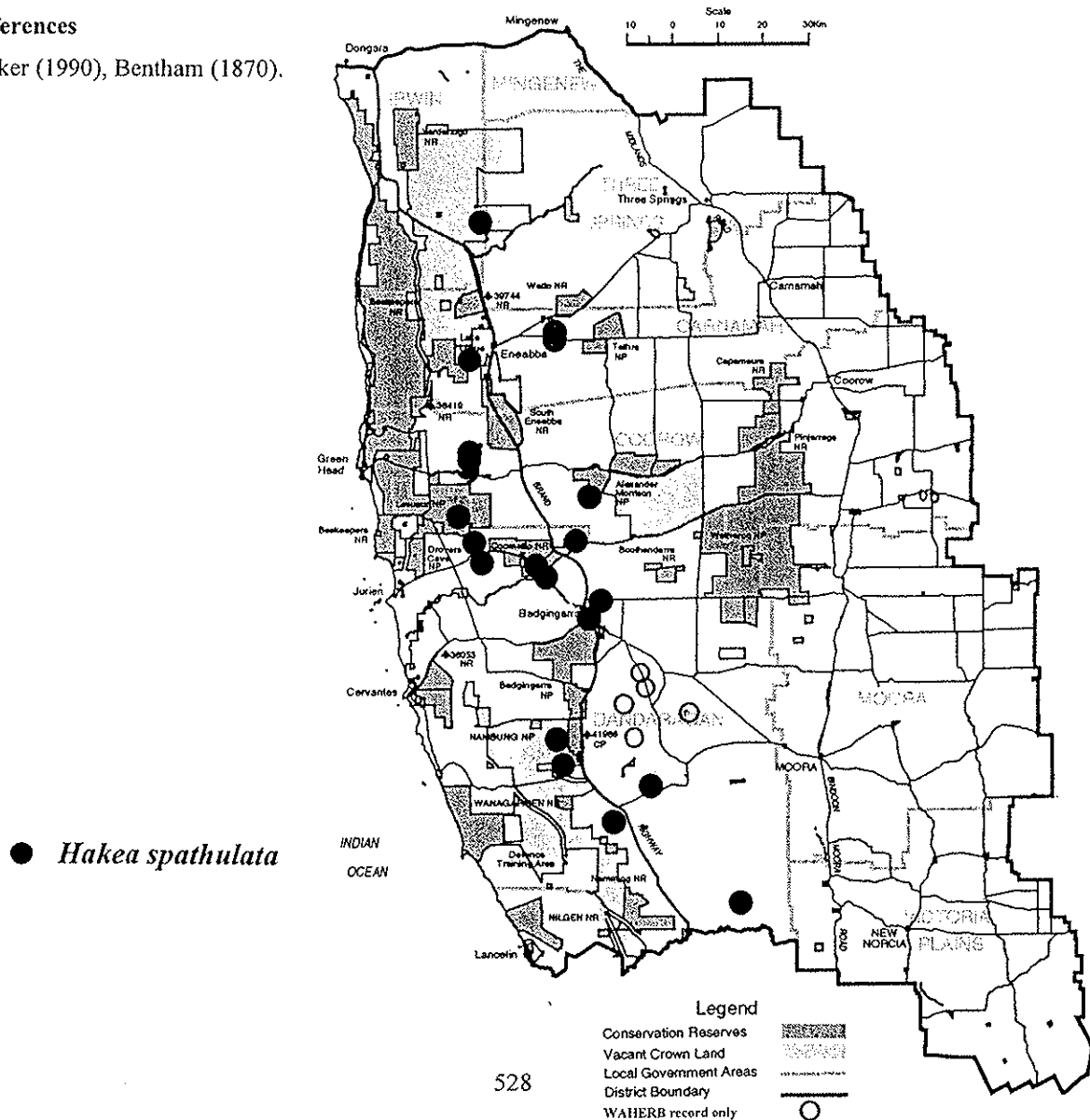
Presumed susceptible

### Management Requirements

- Ensure that dieback hygiene procedures are carried out at all populations.

### References

Barker (1990), Bentham (1870).



A shrub with slender, divaricate branches, the young branches and foliage with long spreading hairs and opposite rows of shorter hairs on the branches. The leaves are opposite, sessile, obovate or oblong, obtuse and rather thick, 4-6 mm long. The flowers are solitary in the axils and nearly sessile, with linear or linear-lanceolate bracts. The calyx is hairy with long spreading hairs, the teeth are nearly equal, obtuse and longer than the tube. The corolla is scarcely longer than the calyx, with lobes almost equal. The connective of the upper anthers has the lower end dilated and bearded, and that of the lower anthers is elongated and ends in a second cell nearly as large as the perfect one.

This species is similar to *Hemigenia scabra* but differs in presence of lines of hairs on the stems and in the distribution of long hairs on the calyx tube rather than on the lobes.

**Flowering Period:** Unknown (var. *major* from the Morowa area flowers in September)

**Distribution and Habitat in the Moora District**

Specimens identified as this species from near Watheroo, and the Three Springs area are not now considered to be *H. pimelifolia*. Recent work on the genus by B.L. Rye has indicated that a single specimen from Hutt River apparently matches the Type description, which is based on material reportedly from the Murchison River. Thus this species is currently known only from the Geraldton District. Specimens from Kadje Kadje and the Koolanooka Hills, both east of Morowa in the Geraldton District, have been labelled var. *major* C.A.Gardner ms. Gardner noted that they had larger, more acute, less coriaceous leaves than the Type and that they had sparse hairs between densely hairy rows on the stems.

No details of habitat are known.

**Conservation Status**

Current: Priority 3

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

**References**

Bentham (1870), Mueller (1868), B. Rye (personal communication).

## *Isopogon drummondii* Benth.

## PROTEACEAE

A lignotuberous spreading shrub to 1 m high. The leaves are terete, simple and pungent, 2-5 cm long. The leaves are glabrous but the stems and young shoots are densely hairy. The flowers are in globular, terminal heads, with narrow, densely villous cone scales. The heads are up to 2.5 cm in diameter and are very conspicuous even when in bud, owing to the grey, woolly appearance. The flowers are creamy-yellow. The fruiting heads are persistent on the plant for some time.

**Flowering Period:** February-April (or June)

### Distribution and Habitat in the Moora District

Known in the Moora District from west of Dandaragan south to the Mogumber-Regans Ford area, and extending south to the Moore River National Park. There is an earlier record from east of Jurien Bay. This species also occurs in the Perth District where it grows in the foothills of the Darling Scarp between Orange Grove and Stratton.

Grows on sand with laterite, in the Moora District on hills towards the edge of the scarp, in heath or scrub beneath open banksia woodland.

### Conservation Status

Current: Priority 3

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. NW of Cataby	D	Conservation Park	13.9.1993	30+	Healthy
2. SE of Dandaragan	D	Shire Road Verge	3.11.19921	3	Partly disturbed
3. W of Mogumber	D	Shire Road Verge	27.2.1991	15	Undisturbed
4. W of Mogumber	D	Shire Road Verge	27.2.1991	100+	Undisturbed
5. W of Mogumber	D	Shire Road Verge	8.12.1992	11	Undisturbed
6. W of Mogumber	D	Shire Road Verge	8.12.1992	9	Partly disturbed
7. Koodjee Road	D	Shire Road Verge	12.12.1990	20	Undisturbed
8. Capitella Road	D	Shire Road Verge	12.12.1990	34	Undisturbed
9. Capitella Road	D	Shire Road Verge	12.12.1990	6 est.	Undisturbed
10. Boundary Road	D	Shire Road Verge	12.12.1990	16	Undisturbed
11. Red Gully Road	G	Shire Road Verge	8.12.1992	8	Partly disturbed
12.* Cockleshell Gully	-	-	2.1965	-	-

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

### Management Requirements

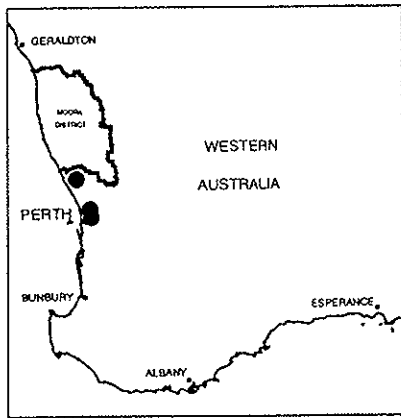
- Ensure that dieback hygiene procedures are carried out at all populations.

### Research Requirements

- Further survey is required.

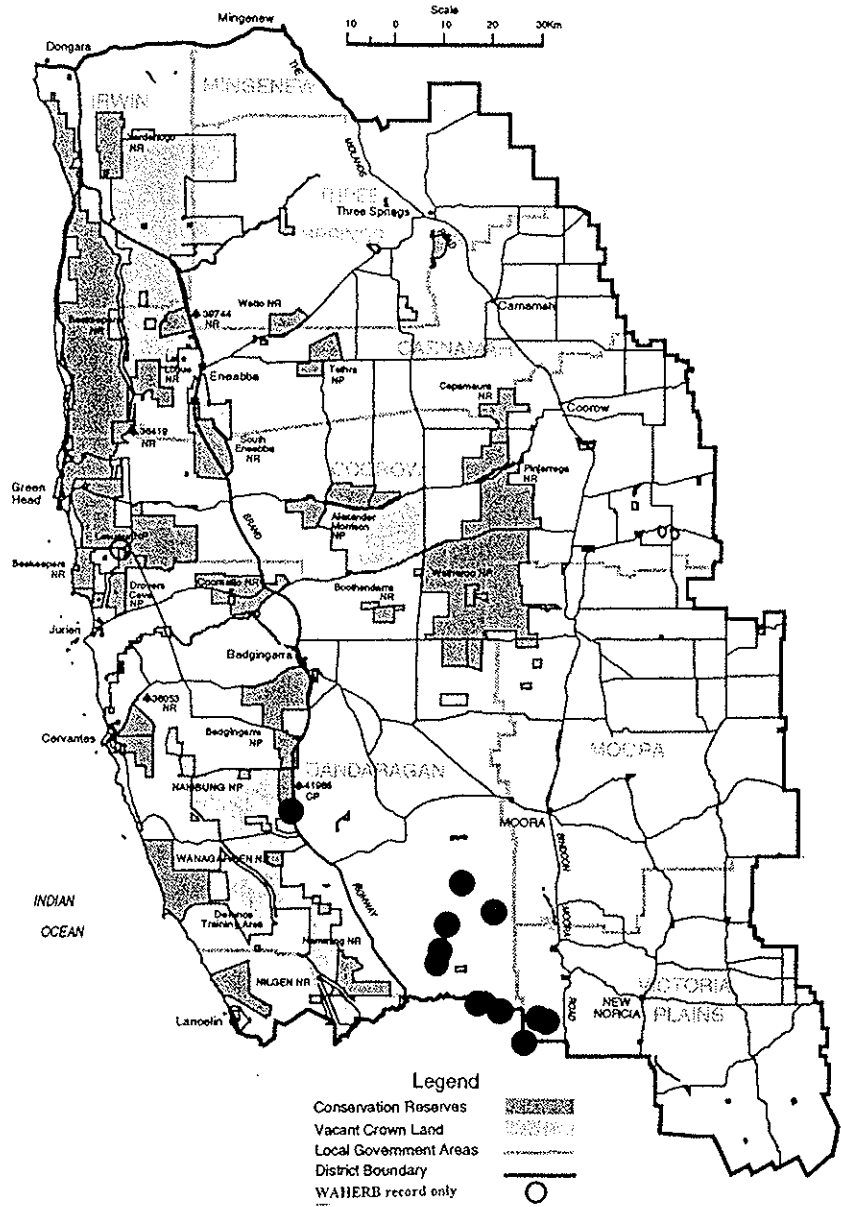
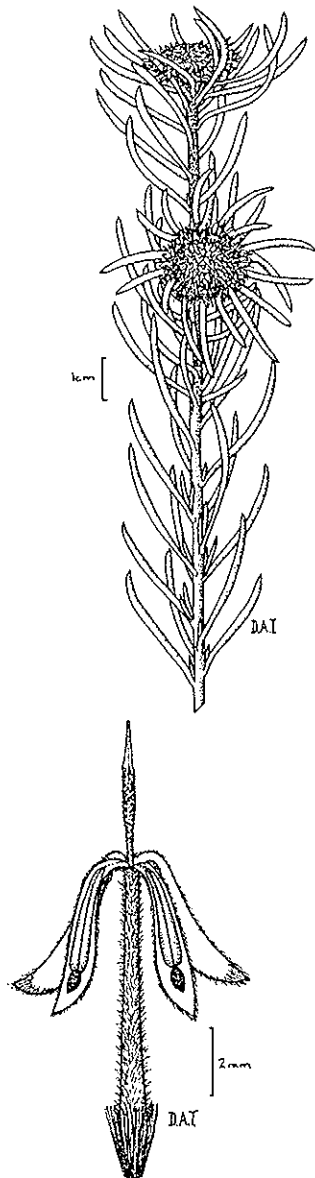
References

Bentham (1870), Kelly *et al.* (1993), Marchant *et al.* (1987), Sainsbury (1987).



Locality Map

● *Isopogon drummondii*



## *Isopogon tridens* F. Muell.

PROTEACEAE

### Three-toothed Coneflower

An erect, bushy shrub to 1.2 m tall. The leaves are flat, narrow-cuneate, usually three-toothed at the apex. They have a long petiole, are thick in texture, and are 3-7 cm long. The flowers are white to purple in colour. They are grouped in terminal, sessile heads which are depressed globular in shape with a convex receptacle. The inflorescence is surrounded by bracts which are numerous and overlapping. The perianth is glabrous. The pollen presenter is spindle-shaped. The exposed tips of the cone-scales are white-woolly and the nuts have a tuft of hairs at the tip.

**Flowering Period:** June-August

### Distribution and Habitat in the Moora District

This species was searched for in the Eneabba area in 1981 by J. Lewis and it was reported to have been found at 84 sites, which were mapped, the species having a restricted distribution from Arrowsmith to south of Eneabba. Lewis also reported that the species was more or less continuous throughout its range. Its range has more recently been found to extend north-east to west of Yandanooka, population 2. Many of the populations found by Lewis occurred in an area north of Eneabba which has since been gazetted as a nature reserve (approx. 24 populations). Others occur in a nature reserve and mining lease on Vacant Crown Land to the south of Eneabba (Lewis 1981), but part of the area is mined and some populations may have been destroyed. No voucher specimens have been deposited at the Western Australian Herbarium to confirm these populations of *Isopogon tridens* and the locations and population sizes were not recorded in Lewis 1981. He noted that this species tends to occur as solitary, widely separated plants.

Grows in white or grey sand over laterite in low open heath, or high shrubland. Lewis found that it grows on interdunal swales as well as the crests and slopes of dunes in undulating topography, and also occurred on pale yellow and pinkish sand. He listed a number of emergent species occurring in association, *Eucalyptus todtiana*, *Xylomelum angustifolium*, *Banksia attenuata*, *B. candolleana*, *B. hookerana*, *B. menziesii*, *B. sphaerocarpa* and *Hakea obliqua*.

### Conservation Status

Current: Priority 3

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* S of Eneabba	Ca	VCL (Mining Lease)	27.4.1978	-	-
2.* W of Yandanooka	Mi	-	4.8.1983	-	-
3.* Eneabba-Carnamah Road	Ca	-	3.8.1983	-	-
4.* S of Eneabba	Co	-	20.7.1978	-	-
5.* SE of Lake Indoon	Ca	-	16.12.1976	-	-
6.* SW of Eneabba	Ca	-	14.8.1972	-	-
7.* W of Three Springs	TS	-	1.11.1974	-	-
8.* Arrowsmith	I	-	28.6.1970	-	-
9.* NE of Lake Logue	Ca	-	27.8.1948	-	-

### Response to Disturbance

It was found that this species did not show preference for disturbed areas (Lewis 1981).

## Susceptibility to *Phytophthora* Dieback

Presumed susceptible

### Management Requirements

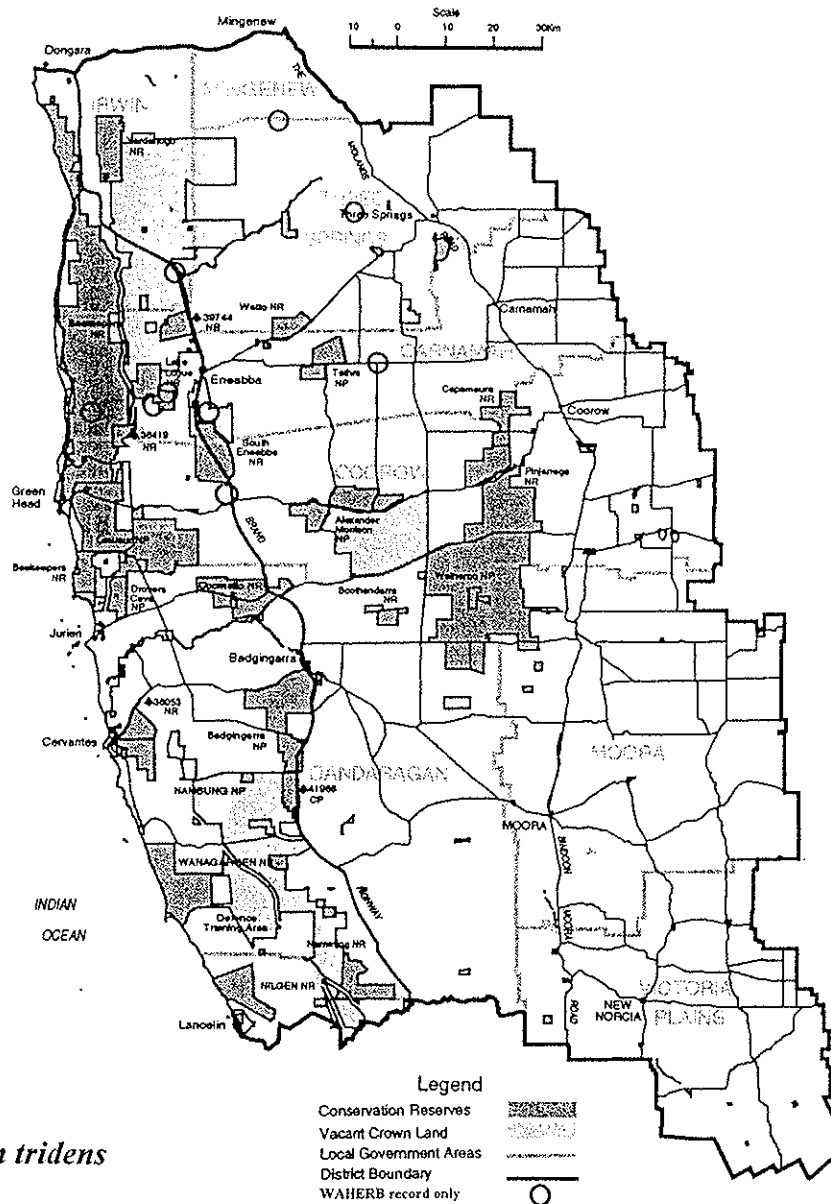
- Ensure that dieback hygiene procedures are carried out at all populations.

### Research Requirements

- Further survey is required, particularly in reserves to the north and south of Eneabba where the species was recorded by Lewis. If found to be as common as indicated by Lewis in those areas, it should be removed from the Priority Flora List.

### References

Bentham (1870), Blackall and Grieve (1988), Lewis (1981), Mueller (1868).



## *Jacksonia anthoclada* Chappill ms

FABACEAE

[*Jacksonia* sp. Mt Lesueur (E.A.Griffin 5571) sp. 42]

A tall, single-stemmed, leafless shrub to 2.5 m tall, the juvenile leaves are elliptic with dentate margins, reduced to scale leaves as the stems become older. The flowers grow singly on short stalks on the flattened stems. The calyx is split to the base, with silky grey hairs on the outside of the lobes, which are recurved at flowering. The flower has yellow-orange petals, the standard is wider than tall, with red markings. The fruit is a broadly elliptical pod with long woolly hairs and is covered by the calyx during development.

Differs from *Jacksonia densiflora* in the presence of flowers on the phylloclades.

**Flowering Period:** November-April

### **Distribution and Habitat in the Moora District**

Occurs from south of Eneabba to south of Dandaragan.

Grows in white or grey sand over laterite in heath with species of *Adenanthos* and *Banksia*.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Tootbardie Road	Co	-	14.3.1990	-	-
2. N of Coorow-Greenhead Road	Co	-	25.4.1992	-	-
3. N of Wongonderra Road	D	-	29.4.1992	-	-
4. S of Koonah Road	D	-	3.9.1992	-	-
5. Banovich Road	D	-	12.12.1991	-	-
6. Banovich Road	D	-	12.12.1991	-	-
7. N of Banovich Road	D	-	25.4.1992	-	Seedlings present
8. S of Halfway Mill Roadhouse	Co	-	12.12.1991	-	-
9.* SE of Eneabba	Co	-	23.12.1980	-	-
10.* SE of Eneabba	Co	-	30.4.1980	-	-

### **Response to Disturbance**

Unknown

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

Presumed susceptible

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

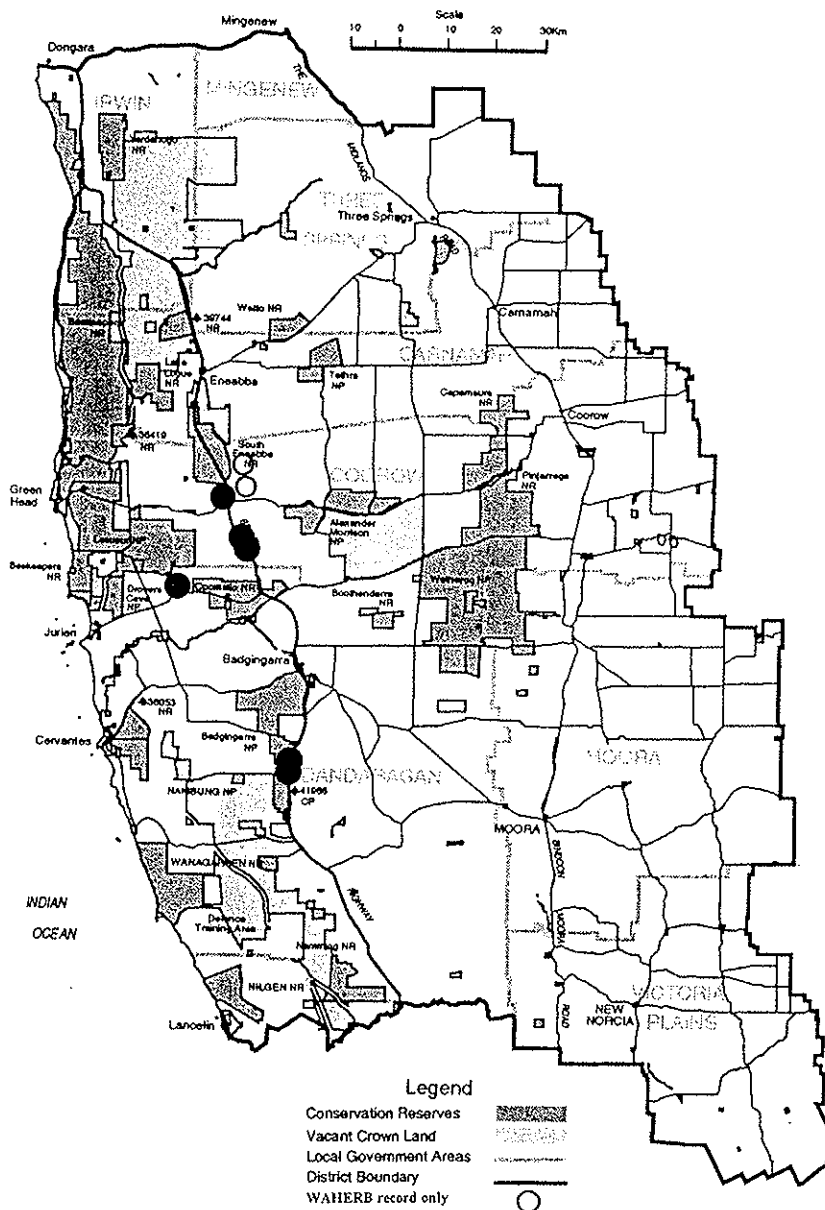
### **Research Requirements**

- Further survey is required.



References

J. Chappill (personal communication).



● *Jacksonia anthoclada ms*

## *Jacksonia carduacea* Meisn.

FABACEAE

An erect, bushy shrub to 50 cm tall, with straight, erect branches. There are numerous thick, rigid leaf-like branchlets, which are flat, sessile, cuneate-oblong in shape, with prickly toothed edges. They are up to ca. 2.5 cm long. The flowers are in heads, which are sessile in the axils of the upper phyllodes and are somewhat hidden, being shorter than the phyllodes. The flower stalks are very short, the calyx has long, silky hairs and the narrow lobes have long narrow points. The petals are nearly equal in length and are shorter than the calyx, which is ca. 12 mm long. The flowers are yellow or yellow and red in colour. The fruit is a pod.

**Flowering Period:** August-January

### **Distribution and Habitat in the Moora District**

Occurs between Watheroo, Alexander Morrison National Park and south-east of Badgingarra.

Grows in grey sand or sandy clay in low heath, sometimes beneath low open woodland of *Eucalyptus todtiana*, and with *Eremaea pauciflora* and *Adenanthos cygnorum*.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Watheroo West Road	D	-	7.11.1988	-	-
2. Alexander Morrison	Co	National Park	20.10.1987	Occasional-WH	-
3.* S of Badgingarra	D	Nature Reserve	5.11.1975	-	-
4.* W of Watheroo	-	-	11.1967	-	-
5.* NE of Badgingarra	D	-	14.12.1962	-	-
6.* W of Watheroo	D	-	9.1962	-	-
7.* Watheroo	Mo	-	4.11.1954	-	-

### **Response to Disturbance**

Unknown

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

Presumed susceptible

### **Management Requirements**

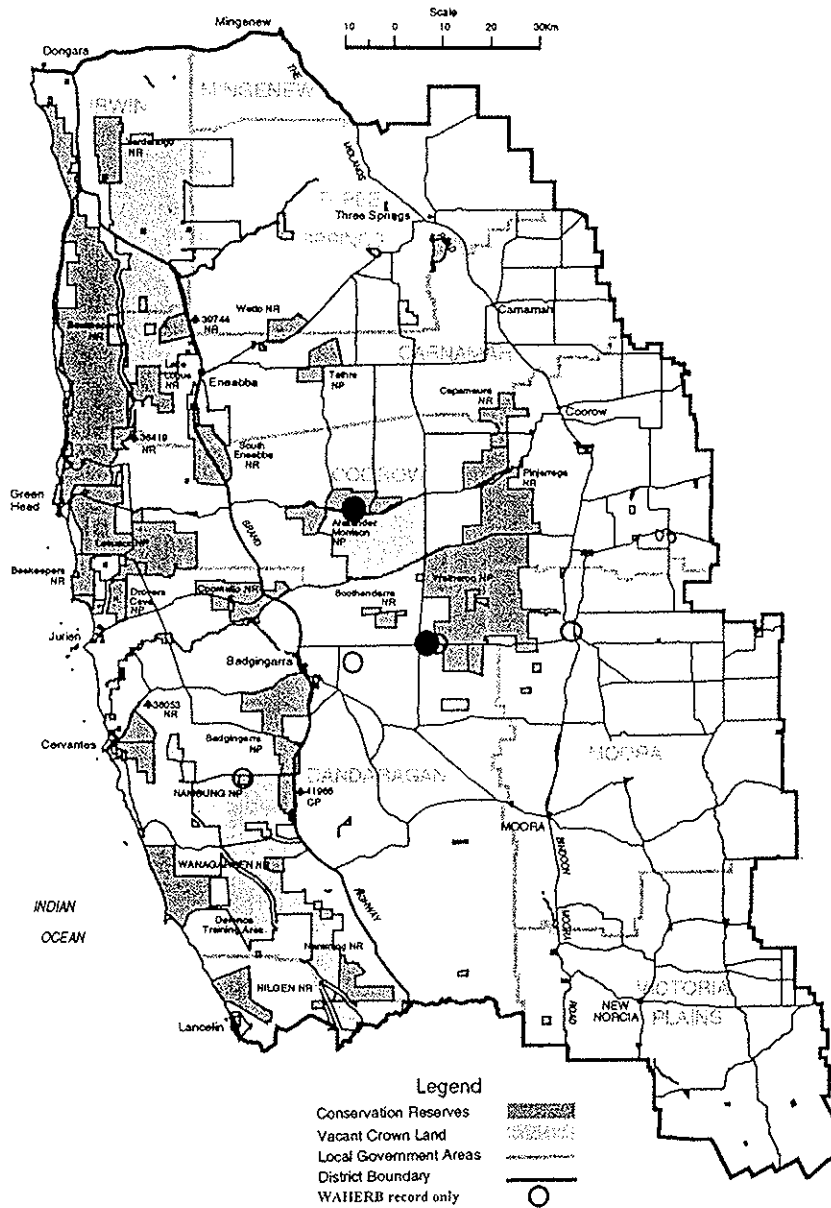
- Ensure that dieback hygiene procedures are carried out at all populations.

### **Research Requirements**

- Further survey is required.

### **References**

Bentham (1864), Meisner (1855).



● *Jacksonia carduacea*

An erect shrub to 2 m tall with white hairs on the branches. The leaves are elliptic to spatulate in shape, arranged closely on the branches. The flowers are in terminal, globular heads to 2.5 cm in diameter with many flowers in each. The petals are pink. The fruits are campanulate, arranged in long clusters around the branches in the axils of the leaves.

**Flowering Period:** September-October

#### **Distribution and Habitat in the Moora District**

Endemic to the Moora District where it occurs from Watheroo to Moora.

Grows in clayey sand or lateritic soil, sometimes with chert. Occurs in open scrub or heath.

#### **Conservation Status**

Current: Priority 3

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. NW of Watheroo	Mo	National Park	20.9.1991	150+	Partly disturbed, heavy recreational use
2. NW of Watheroo	Mo	National Park	20.9.1991	9	Undisturbed
3. N of Watheroo	Mo	MRWA Road Verge	17.10.1991	4	Undisturbed
4. SW of Moora	D	Shire Road Verge	19.9.1991	2	Undisturbed
5. SW of Moora	D	Shire Road Verge	15.10.1991	2	Disturbed
6. N of Moora	Mo	Railway Reserve	16.10.1991	15	Undisturbed
7. SW of Watheroo	Mo	Private	16.10.1991	317	Undisturbed
8. SW of Gunyidi	Mo	Nature Reserve	9.10.1992	-	-
9. W of Moora	D	Shire Reserve	15.10.1991	Occasional-WH	-

#### **Response to Disturbance**

Unknown

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

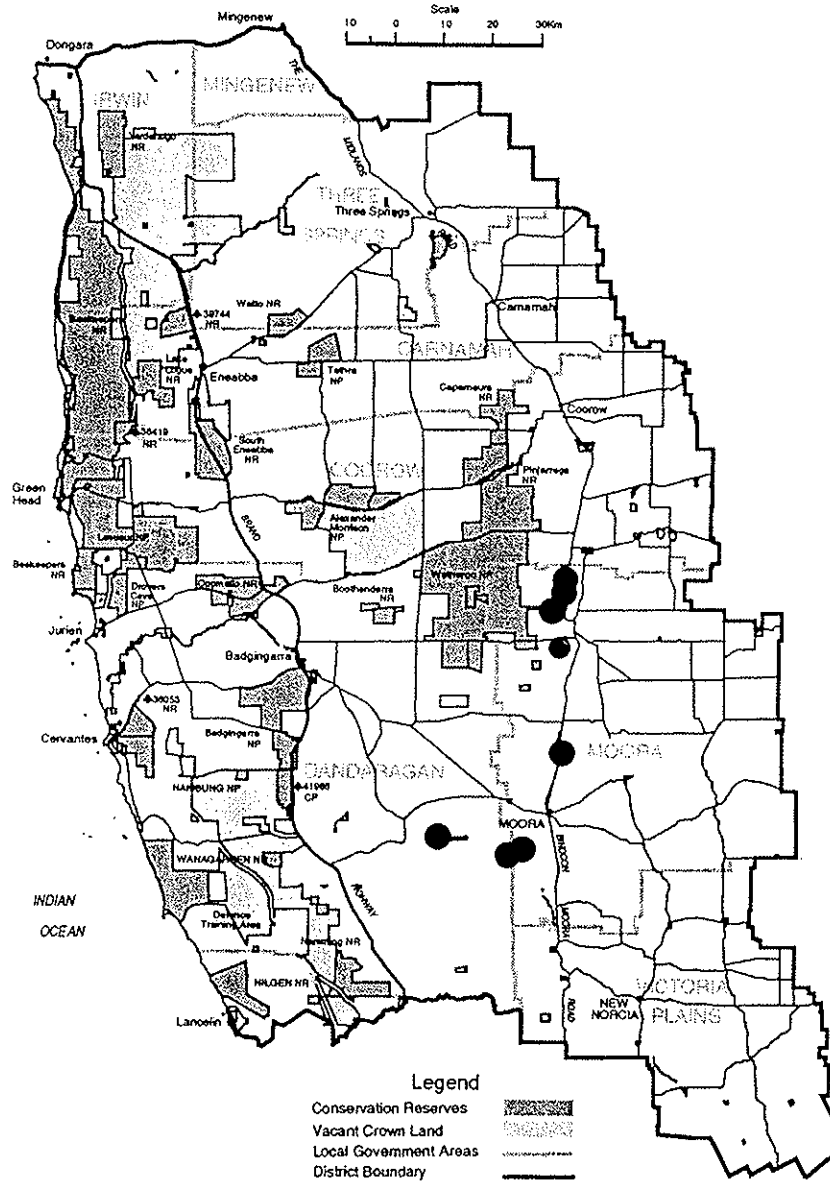
Presumed susceptible

#### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

#### **Research Requirements**

- Further survey is required. Most populations are small and several are on road verges.
- Further taxonomic work is required.



● *Kunzea incognita* ms

## *Lasiopetalum lineare* Paust

## STERCULIACEAE

An erect, multistemmed shrub to 40 cm tall. The leaves are alternate, narrowly linear in shape, 20-40 mm long, 1-4 mm wide. The flowers are in leaf-opposed cymes with about eight flowers, contracted into loose heads.

The calyx lobes are linear, the bracteoles are equal to or longer than the calyx, thread-like, ca. 4 mm long. The calyx is lilac in colour, with white stellate hairs on the outside, divided to the base into five linear-lanceolate lobes. There are five orbicular petals ca. 0.5 mm long. The five anthers are almost sessile and the globular 3-celled ovary is covered with white stellate hairs. The filiform style has reflexed stellate hairs.

Some populations, particularly those in the Eneabba area, appear to be intermediate with *Lasiopetalum drummondii*, with the leaves shorter and broader than those of *L. lineare* and the flowers slightly larger.

**Flowering Period:** July-November

### Distribution and Habitat in the Moora District

Occurs from Eneabba and Watheroo, south to the Badgingarra area and south of the Moora District in the Swan Region.

Grows in white to grey sand in open scrub or open low banksia woodland.

### Conservation Status

Current: Priority 3

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. W of Brand Mudge Road	Co	Shire Road Verge	5.11.1992	4	Undisturbed
2. Cadda Road	D	-	7.12.1992	-	-
3.* Badgingarra	D	National Park	6.10.1981	Occasional-WH	-
4.* N of Eneabba	Ca	-	1.6.1980	-	-
5. Cooljarloo	D	-	1.1987	-	-
6.* Bibby Creek	D	-	14.10.1978	4	-
7.* S of Eneabba	Co	-	20.7.1978	-	-
8.* S of Badgingarra	D	Nature Reserve	5.11.1975	-	-
9.* S of Badgingarra	-	-	17.10.1969	-	-
10.* W of Watheroo	D	-	30.10.1966	-	-

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown, but thought to be high.

### Management Requirements

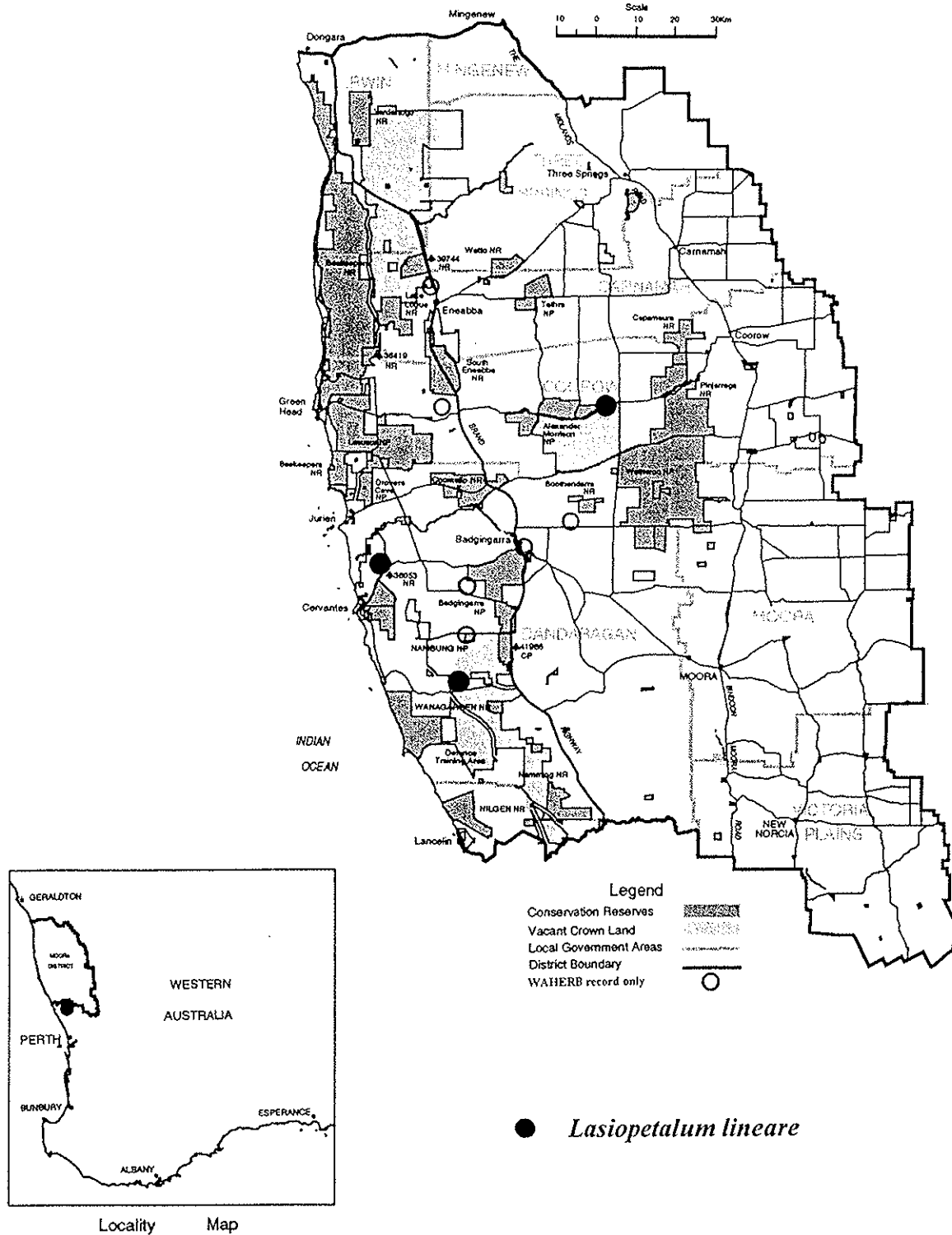
- Ensure that dieback hygiene procedures are carried out at all populations.

## Research Requirements

- Further taxonomic work is required.
- Further survey work is required.

## References

E. Bennett and K. Shepherd (personal communication), Paust (1974).



***Lepidobolus densus*** L.A.S.Johnson & B.G.Briggs ms

RESTIONACEAE

[*Lepidobolus* sp. (B.Briggs 7770)]

A large, many-stemmed plant forming a dense tussock, to 40 cm high, with rhizomes. The stems are yellow-green, glabrous and terete. Each stem has pale chestnut sheathing bracts each with a pungent point. The glumes of the female flower heads are broad and pale chestnut in colour with a darker pungent point, and are edged with white hairs. Those of the male inflorescence are narrower, with a conspicuous, pale margin.

**Flowering Period:** September-November

**Distribution and Habitat in the Moora District**

In the Moora District this species is known from three populations on a nature reserve south-east of Coorow, and from a population ca. 30 km further west on a road verge near the edge of a national park, where further survey may well discover further populations.

The species is also known from Dirk Hartog Island, Shark Bay and Kalbarri.

Grows on yellow or grey sand with lateritic gravel or white grey sandy clay near lakes. It occurs in open shrubland or sandheath with *Lepidobolus preissianus*, *L. chaetocephalus* and species of *Grevillea*, *Melaleuca*, *Banksia*, *Acacia* and *Verticordia*.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Marchagee	Co	Nature Reserve	3.11.1992	70	Partly disturbed
2. Marchagee	Co	Nature Reserve	3.11.1992	400+	Partly disturbed
3. Marchagee	Co	Nature Reserve	17.10.1991	100	Undisturbed
4. SW of Coorow	Co	Shire Road Verge	5.11.1992	20	Partly disturbed
5.* N of Marchagee	Co	-	1.10.1984	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown

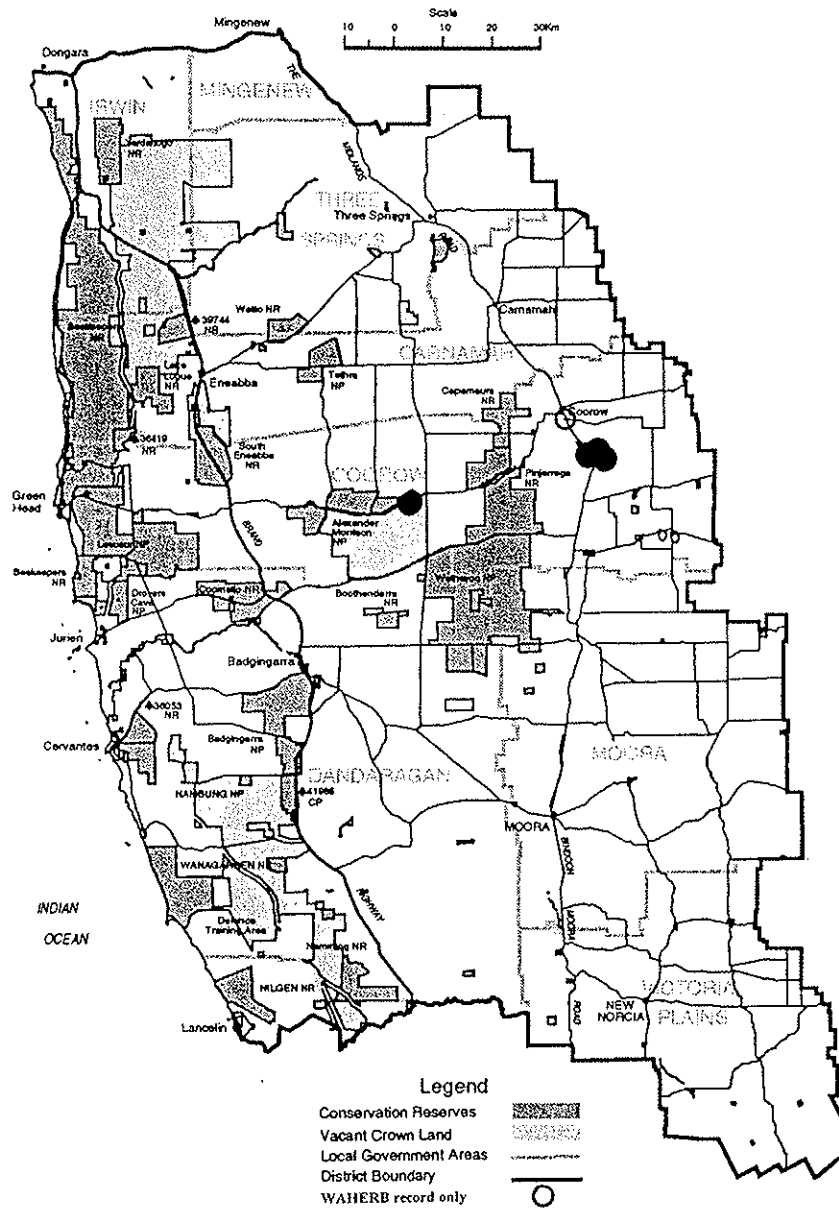
**Management Requirements**

- Ensure that road verge population is marked.
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required, particularly in Alexander Morrison National Park and in the Kalbarri area.





● *Lepidobolus densus ms*

***Lepidobolus quadratus*** L.A.S.Johnson & B.G.Briggs ms

RESTIONACEAE

[*Lepidobolus* sp. (EA.Griffin 2093)]

A tufted, erect perennial sedge to 15-30 cm high with rhizomes. The stems are light green, square and glabrous. The sheathing bracts are pale brown, with a pungent point. The female inflorescences have fewer flowers and are smaller and less conspicuous than those of the male inflorescences and the styles are maroon. The glumes on the male inflorescence have long, pointed tips, giving the inflorescence a bristly appearance. The anthers are cream in colour.

**Flowering Period:** August-December

**Distribution and Habitat in the Moora District**

Grows in white, grey to yellow sand or sandy clay with laterite in open low scrub, or low heath with *Calothamnus sanguineus*, *Lambertia multiflora*, *Xanthorrhoea preissii* and *Dryandra* species on breakaways and uplands.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

---

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Coomallo	D	Nature Reserve	2.7.1992	10	Undisturbed
2. N of Cataby	D	Shire Road Verge	2.7.1992	30	Partly disturbed
3. E of Badgingarra	D	Shire Road Verge	6.11.1992	20+	Some disturbance
4. Brand Highway	Co	MRWA Road Verge	6.11.1992	20+	Some disturbance
5.* Badgingarra	D	Townsite Reserve	23.9.1988	-	-
6.* S of Eneabba	Ca	-	20.10.1978	-	-
7.* S of Cataby	D	-	9.7.1988	-	-
8.* E of Badgingarra	D	-	28.9.1984	-	-
9.* Mt Lesueur	D	National Park	17.7.1979	-	-
10.* W of Mt Lesueur	D	National Park	1.9.1979	-	-
11.* SE of Badgingarra	D	-	10.9.1979	Common-WH	-
12.* N of Regans Ford	D	-	13.8.1972	-	-
13.* S of Cataby	D	?Gravel Reserve	4.9.1981	Fairly common- WH	-

---

**Response to Disturbance**

One population was recorded on a previously burnt area.

**Susceptibility to *Phytophthora* Dieback**

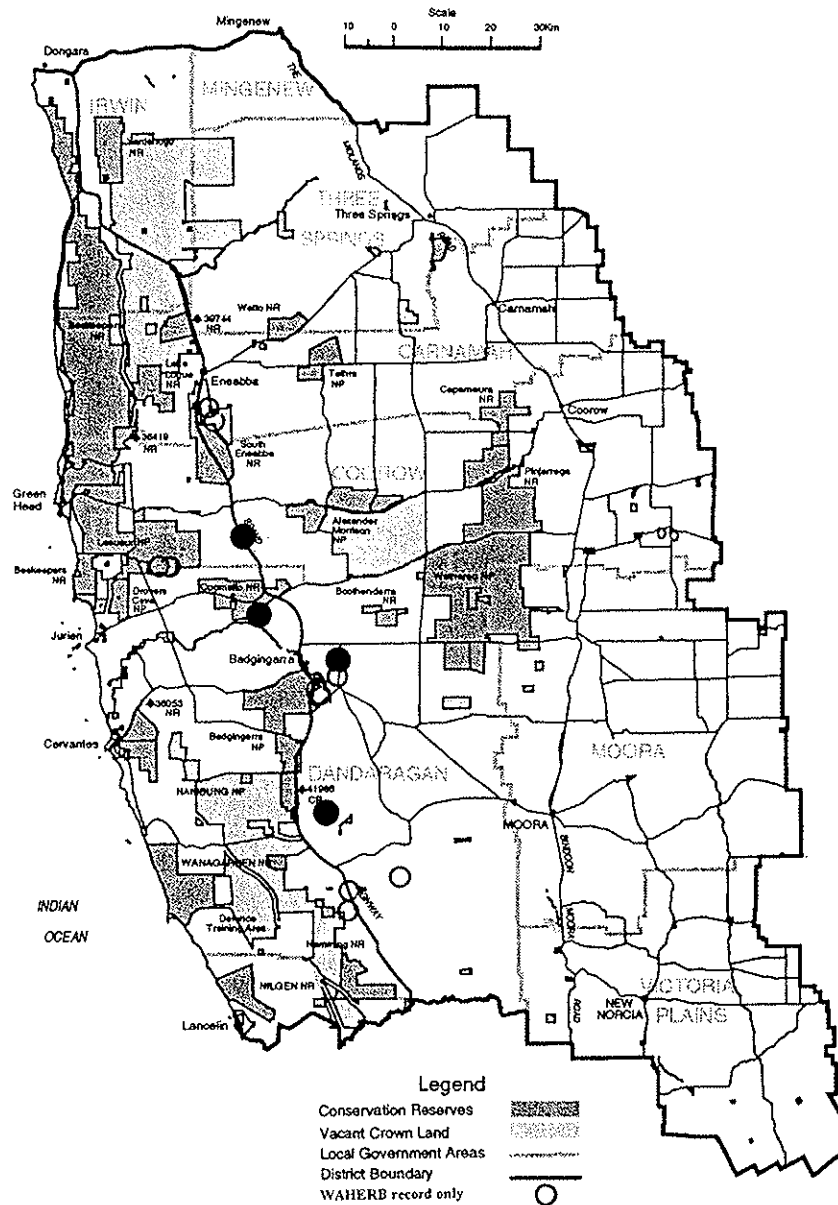
Unknown

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

## Research Requirements

- Further survey is required, particularly to refind populations 5-13, and to survey further in the Lesueur area where many populations have been reported but not vouchered.



● *Lepidobolus quadratus ms*

## *Leucopogon oliganthus* E.Pritz.

EPACRIDACEAE

This species was first collected by Diels and Pritzel from west of Moora in 1901 and from Dandaragan by C.A. Gardner in 1920.

*Leucopogon oliganthus* is a low shrub to 70 cm high. The leaves are lanceolate, shortly hairy, with acute tips, 7 to 10 cm long. They are 6-nerved on the lower surface and convex above. The flowers are grouped in short few-flowered spikes at the ends of short side branches. There are five white tomentose petals. The ovary is two-celled and the style is short.

**Flowering Period:** May-August, November-December

### **Distribution and Habitat in the Moora District**

Recent collections have been made from west of Moora south to the Cataby area and several other populations have been found from just south of the Moora District in a nature reserve on the south side of the Moore River and further south-west to the area north of Gingin.

Grows in grey sand over laterite, or sandy clay on hillslopes in low heath, often in very open woodland of banksia, *Eucalyptus calophylla* or *Nuytsia floribunda*.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. W of Moora	D	Shire Reserve	27.6.1988	-	-
2.* S of Cataby	D	-	29.11.1974	-	-
3. N of Cataby	D	Camping Reserve	1.12.1992	-	-
4. SE of Cataby	D	Nature Reserve	10.7.1988	Scattered-WH	-

### **Response to Disturbance**

Unknown

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

Presumed susceptible

### **Management Requirements**

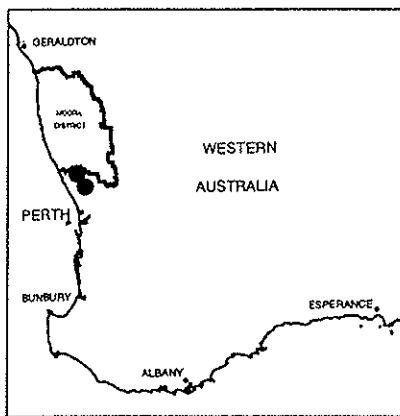
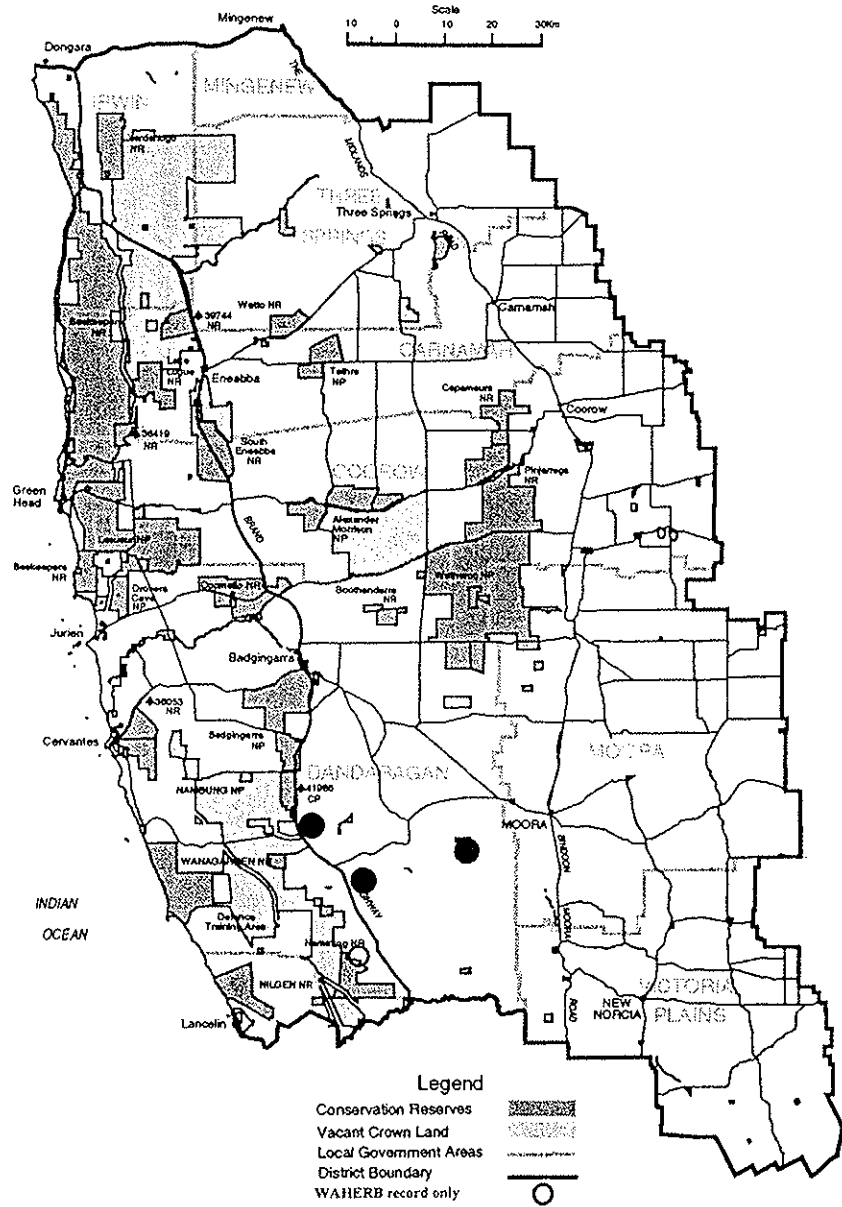
- Ensure that dieback hygiene procedures are carried out at all populations.

### **Research Requirements**

- Further survey is required.

### **References**

Blackall and Grieve (1981), Diels and Pritzel (1904).



Locality Map

● *Leucopogon oliganthus*

## *Melaleuca sclerophylla* Diels

MYRTACEAE

A low shrub, prostrate to erect, to 1 m tall and up to 2 m in diameter, but usually smaller. The leaves are alternate and are covered with small tubercles. They are thick and leathery, oblanceolate in shape, flat and 1-nerved with a blunt tip, 1-2 cm long and ca. 2 mm wide. The flowers are in terminal heads, the calyx tube and lobes with white hairs. The flowers are purple-pink in colour, with stamens less than 1 cm long, the anthers golden. The fruits are in globular clusters of small, cup-shaped capsules.

Similar to *Melaleuca nesophylla*, which has wider, non tuberculate, thinner leaves, and a glabrous calyx tube.

**Flowering Period:** June-October

### **Distribution and Habitat in the Moora District**

A population has been reported from north-east of Carnamah and the species has been collected recently from north of Coorow south to Watheroo and Moora with an earlier record from New Norcia. It is recorded from east of the Moora District in the Ballidu-Wongan Hills-Manmanning area.

Grows in sandy soil with gravel, sometimes associated with chert or granite, in low heath or shrubs or low wandoo woodland.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. SW of Gunyidi	Mo	Nature Reserve	9.19.1992	-	-
2. E of Moora	Mo	-	7.11.1990	-	-
3. N of Coorow	Co	-	19.9.1991	Frequent-WH	-
4.* New Norcia	VP	-	6.1924	-	-

### **Response to Disturbance**

Unknown

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

Presumed susceptible

### **Management Requirements**

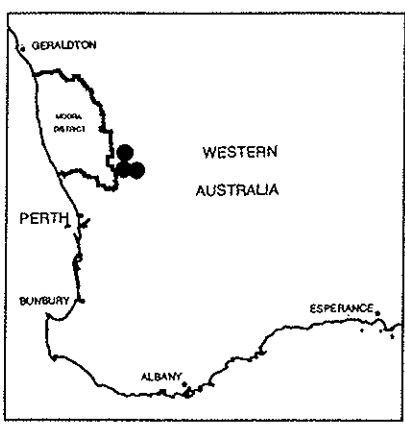
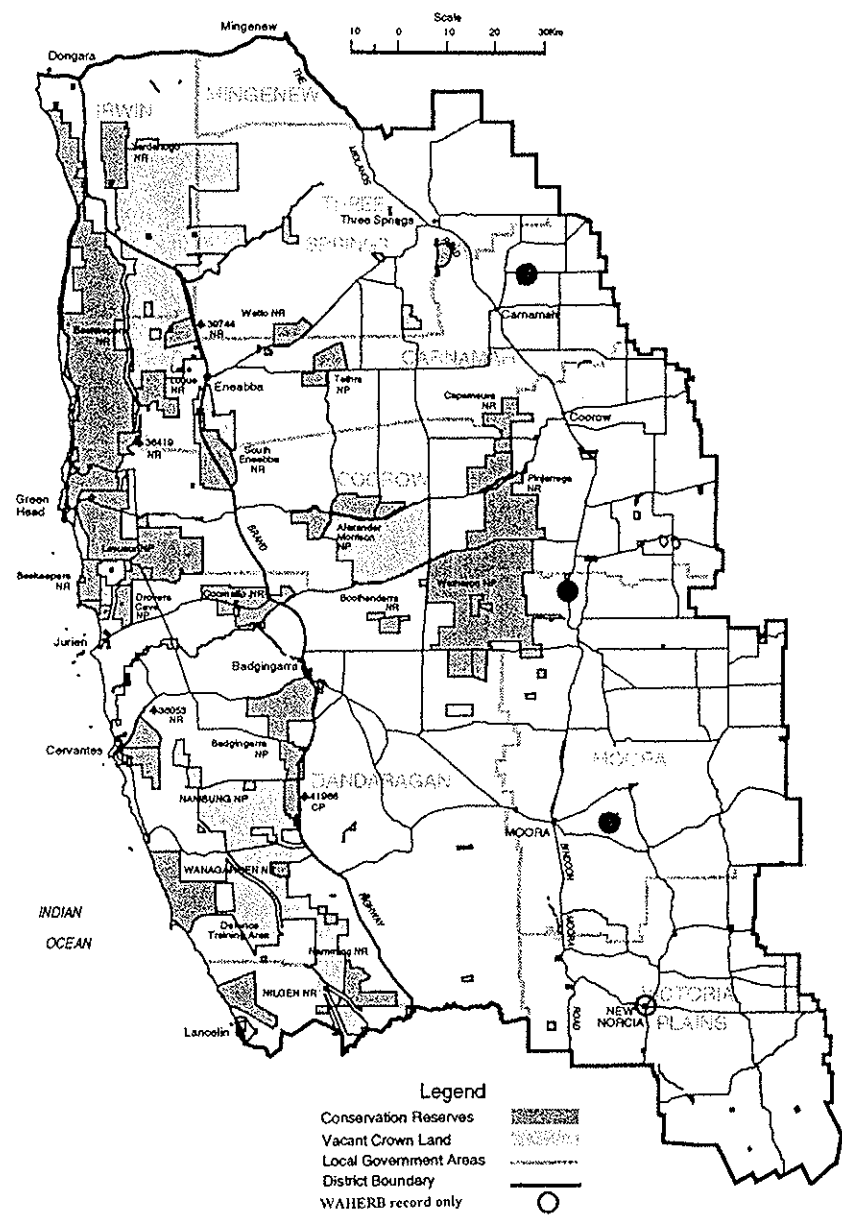
- Ensure that dieback hygiene procedures are carried out at all populations.

### **Research Requirements**

- Further survey is required.

### **References**

Blackall and Grieve (1980), Holliday (1989), Mollemans *et al.* (1993).



Locality Map

● *Melaleuca sclerophylla*

## *Myriocephalus appendiculatus* Benth.

ASTERACEAE

White-tip Myriocephalus

An erect annual herb to 20 cm tall, with few branches and both woolly and glandular hairs. The leaves are linear to narrowly ovate, to 35 mm long, 5 mm wide. The flowers are in a compound terminal head, up to 1.5 cm in diameter. There are several rows of white involucre bracts forming a ray around the yellow flower cluster. Each partial head has 4-6 flowers. The fruits have small hairs.

**Flowering Period:** September-November

### **Distribution and Habitat in the Moora District**

In the Moora District this species has been recorded from the Eneabba area with an early record from Gillingarra, near the southern boundary of the District. Outside the District it occurs much further north around Cue in the Geraldton District, and to the south in the metropolitan area at Ellen Brook. There is also a record from Cape Arid.

In the Moora District it has been recorded growing in deep, coarse sand on a slope at one locality and in sandy clay in low lying areas. Near Cue it grows in red sandy loam at the edge of water pans or on areas which have been previously wet. In the metropolitan area it grows on clay soil of a winter swamp.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* S of Eneabba	Ca	VCL (Mining Lease)	18.9.1977	-	-
2.* W of Lake Indoon	Ca	Shire Recreation Reserve	8.9.1979	Dense colonies-WH	-
3.* Gillingarra	VP	-	13.11.1906	-	-

### **Response to Disturbance**

Unknown

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

Unknown

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

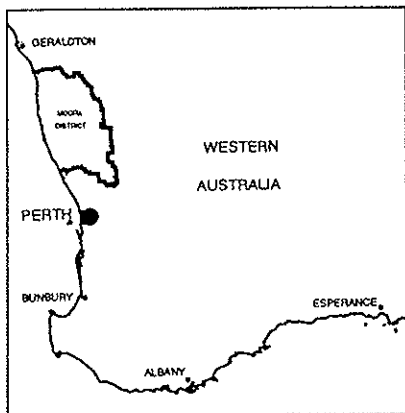
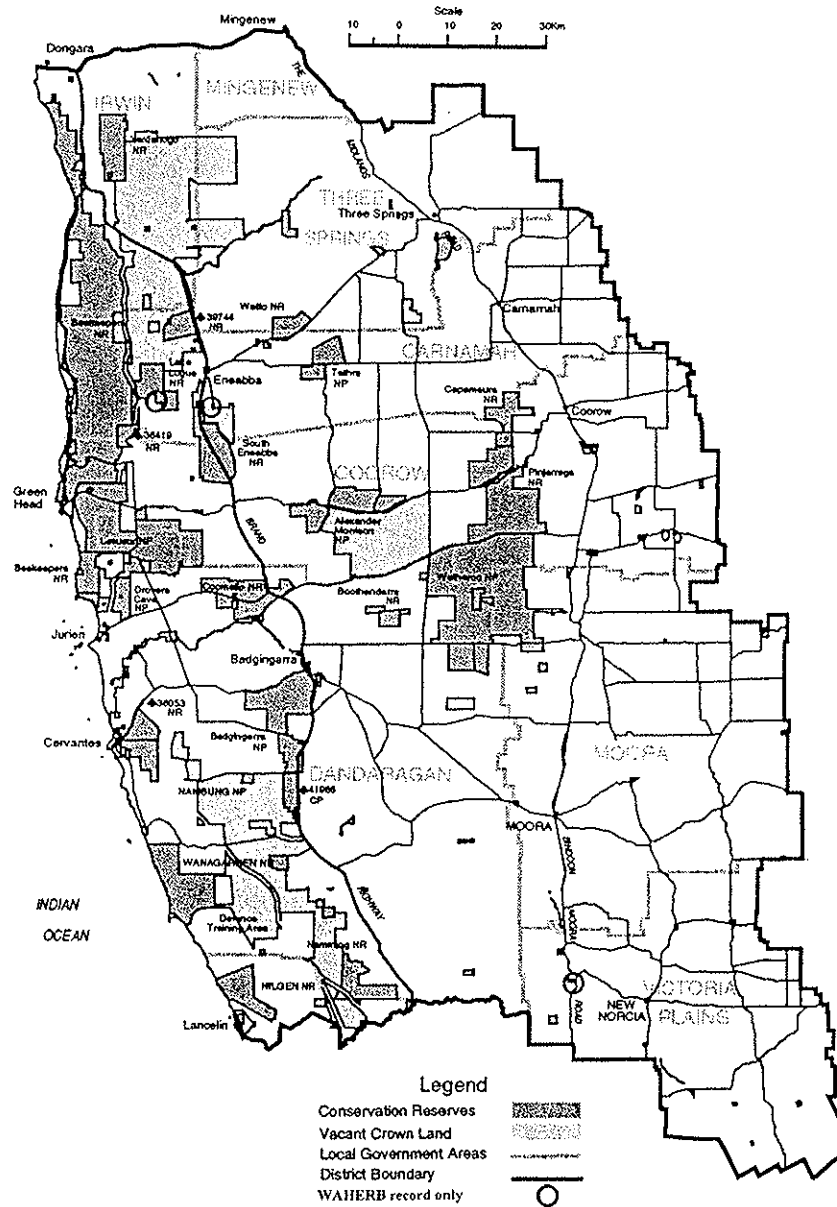
### **Research Requirements**

- Further survey is required.

### **References**

Bentham, (1867), Kelly *et al.* (1993), Marchant *et al.* (1987).





Locality Map

● *Myriocephalus appendiculatus*

## *Nemcia acuta* (Benth.) Domin

FABACEAE

An open, low shrub to 1 m high. The leaves are in whorls of three or four, sessile, narrowly elliptic in shape, broadest at or below the middle. They taper to the apex which has a pungent point, and they are up to 22 mm long and 9 mm wide. There is a pair of stiff stipules at the base of each leaf. The flowers are in loose axillary clusters, with three-lobed ovate bracts. The standard petal is yellow and dark reddish-brown, to 12 mm long. The wings and keel petal are reddish-brown. The fruit is an ovoid hairy pod to 8 mm long.

This species is similar to *Nemcia epacridoides* which has broader leaves with a rounded to cordate base, and no stipules at the base of the leaf stalk.

Originally described as *Gastrolobium*, but since has been treated as *Oxylobium* for many years (Bentham 1864). Marchant *et al.* (1987) reinstated the species as *Gastrolobium* on the basis of the ovule number, which is consistently two. In 1987 the classification of *Gastrolobium* was revised by Crisp and Weston, who transferred all toxic species of *Gastrolobium* and *Oxylobium* to *Gastrolobium* and related non-toxic species to *Oxylobium*, *Callistachys* or *Nemcia*. Thus species of *Gastrolobium* with trifid bracts and condensed inflorescences were transferred to *Nemcia*.

**Flowering Period:** August-September

**Fruiting Period:** November

### Distribution and Habitat in the Moora District

Most populations of this species are known from the western edge of the Darling Scarp and Range in the Perth area, within the Swan Region. It also occurs just north of Bindoon, and has been collected in the past from south of Mogumber and from east of Regans Ford. Both these records are on the southern boundary of the Moora District.

Grows in shallow, heavy soils and lateritic gravel sometimes near granite boulders, in very open wandoo and marri woodland, over open scrub.

### Conservation Status

Current: Priority 3

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* 70 mile peg, Geraldton Highway	-	-	1.9.1958	-	-
2.* 8 miles east of Regans Ford	-	-	26.8.1964	-	-

### Response to Disturbance

Regenerates well from seed after fire.

### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

### Management Requirements

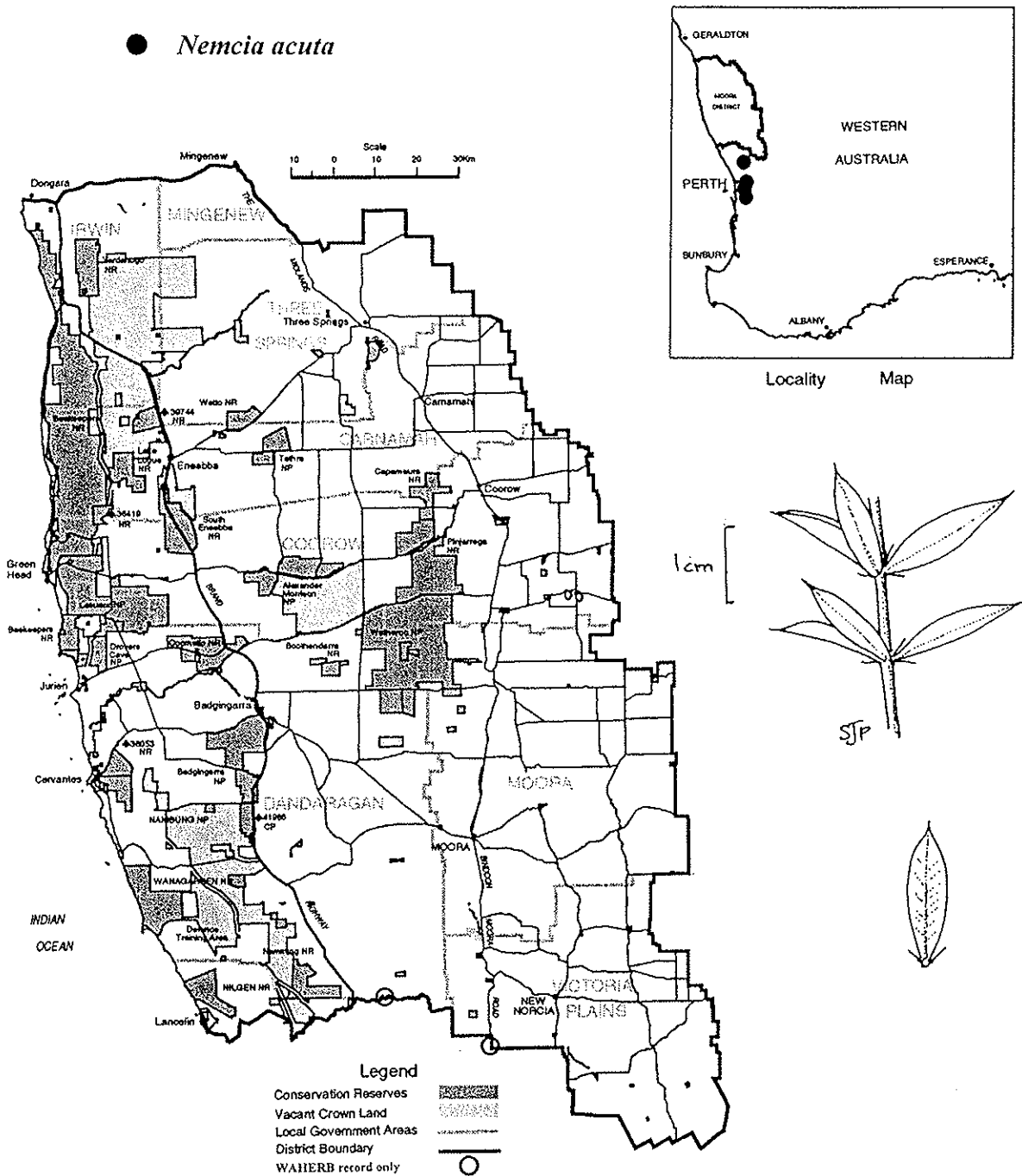
- Ensure that dieback hygiene procedures are carried out at all populations.

## Research Requirements

- Further survey is required in suitable habit for this species in the southern part of the Moora District and adjoining parts of the Swan Region.

## References

Bentham (1864), Crisp and Weston (1987), Marchant *et al.* (1987).



A spreading, diffuse shrub to 70 cm tall with flattened young branchlets, which are slightly zig-zag. The leaves are linear to narrowly ovate, concave, 2-6 mm long with a hooked tip. They are in two opposite rows and fall after the first year leaving prominent scars on the branches. The floral leaves are little wider than the stem leaves. The calyx is very short and the corolla is white and five-lobed. It has a few hairs at the base of the lobes and is papillose in the throat. There are three stamens and five staminodes which are bifid and papillose in the lower half. The fruit is fleshy with a hard seed and is 8-10 mm long.

This species is similar to *Olax benthamiana* which has a smaller fruit, shorter, broader floral leaves and a smooth corolla throat.

**Flowering Period:** October-November

#### Distribution and Habitat in the Moora District

*O. scalariformis* occurs in the Moora District from north of Eneabba to the Lesueur area. It has also been found to occur to the south of the District in the Moore River National Park and the Gingin area, and in the metropolitan area at Forrestfield.

Grows in white-grey sand or sandy loam sometimes over laterite or limestone. May occur in or near swamps or open flats usually in open shrubland or open heath.

#### Conservation Status

Current: Priority 3

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.*E of Jurien	D	-	3.12.1982	-	-
2.*E of Jurien	D	-	3.12.1982	-	-
3.*E of Jurien	D	-	3.12.1982	-	-
4.*S of Eneabba	Co	VCL (Mining Lease)	12.11.1976	-	-
5.*N of Arrowsmith River	-	VCL	4.8.1976	-	-
6.*N of Mt Lesueur	D	National Park	22.11.1979	-	-

#### Response to Disturbance

Unknown

#### Susceptibility to *Phytophthora* Dieback

Unknown

#### Management Requirements

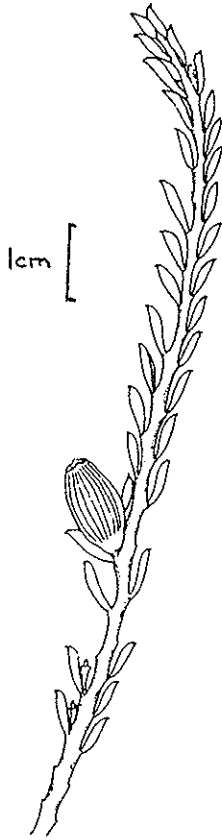
- Ensure that dieback hygiene procedures are carried out at all populations.

#### Research Requirements

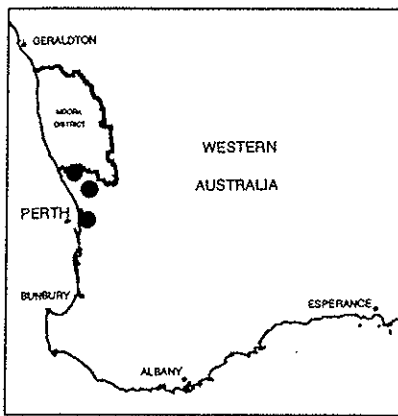
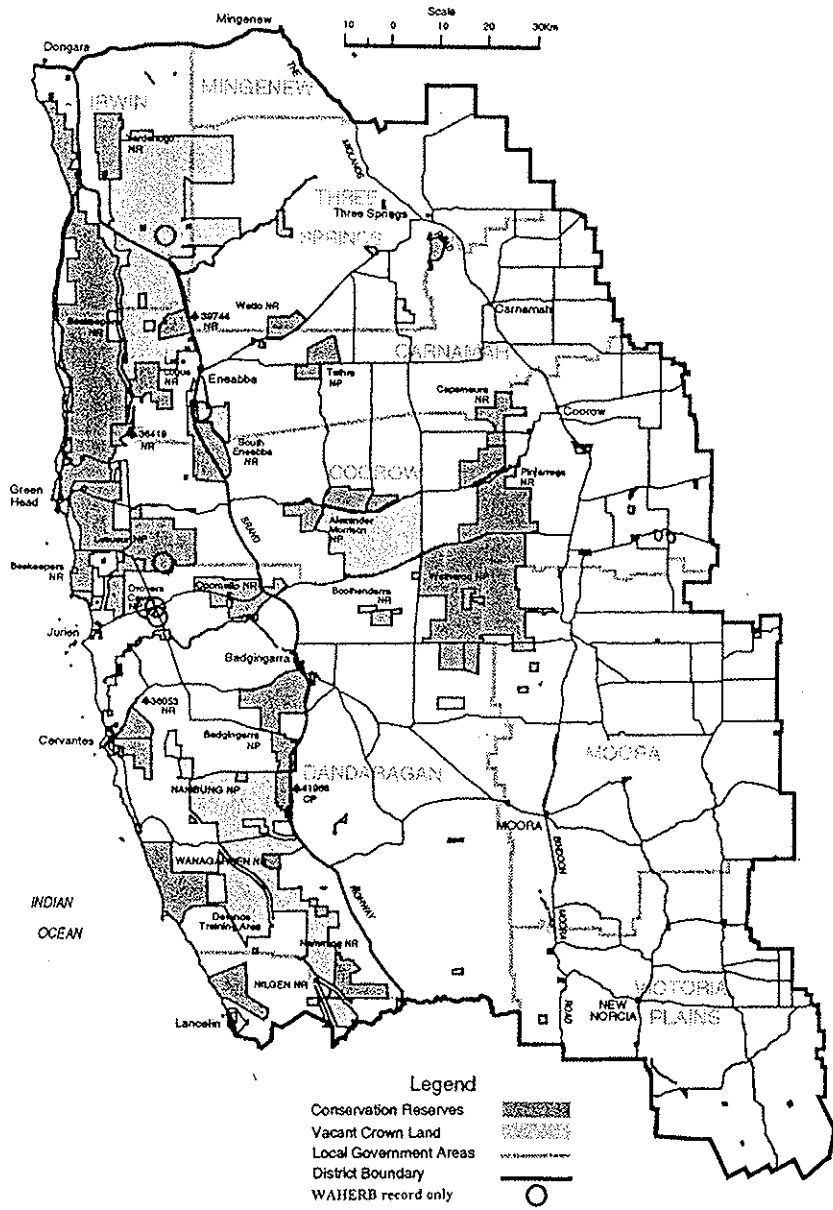
- Further survey is required.

References

George (1984a).



*Olax scalariformis*



Locality Map

● *Olax scalariformis*

*Patersonia argyrea* is a tufted herb with several basal linear leaves which are biconvex and have sheathing bases. The leaves are 20-42 cm long, the leaf surface with deep, pilose grooves, the margins and bases also with silvery hairs. The flowering stems are 20-35 cm long, leafless and covered with long soft hairs. The inflorescence is enclosed by two opposite spathes which are dark chestnut brown, sparsely silky, to 5.2 cm long. The flowers have three very small petals and three broad, spreading sepals, violet in colour. There are three yellow stamens.

The plant has a silvery grey appearance and grooved biconvex leaves, which distinguishes it from other species.

**Flowering Period:** September-November

#### **Distribution and Habitat in the Moora District**

Occurs mainly in the Lesueur area but two other populations have been found recently, further south to the west of Badgingarra. This species is reported to occur at over fifty locations in the Lesueur area but is at present very poorly represented in the Western Australian Herbarium by only six collections (E. Griffin, personal communication).

Grows in grey sand or brown loam and lateritic gravel in open low heath, sometimes in open low marri woodland.

#### **Conservation Status**

Current: Priority 3

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Banovich Road	D	Shire Road Verge	18.11.1992	5	Disturbed
2. Cadda Road	D	Shire Road Verge	20.10.1992	3+	Disturbed, on graded road edge
3.*N of Mt Benia	-	-	23.9.1979	-	-
4.*Mt Lesueur	D	National Park	4.11.1962	-	-

#### **Response to Disturbance**

Unknown

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

Presumed susceptible

#### **Management Requirements**

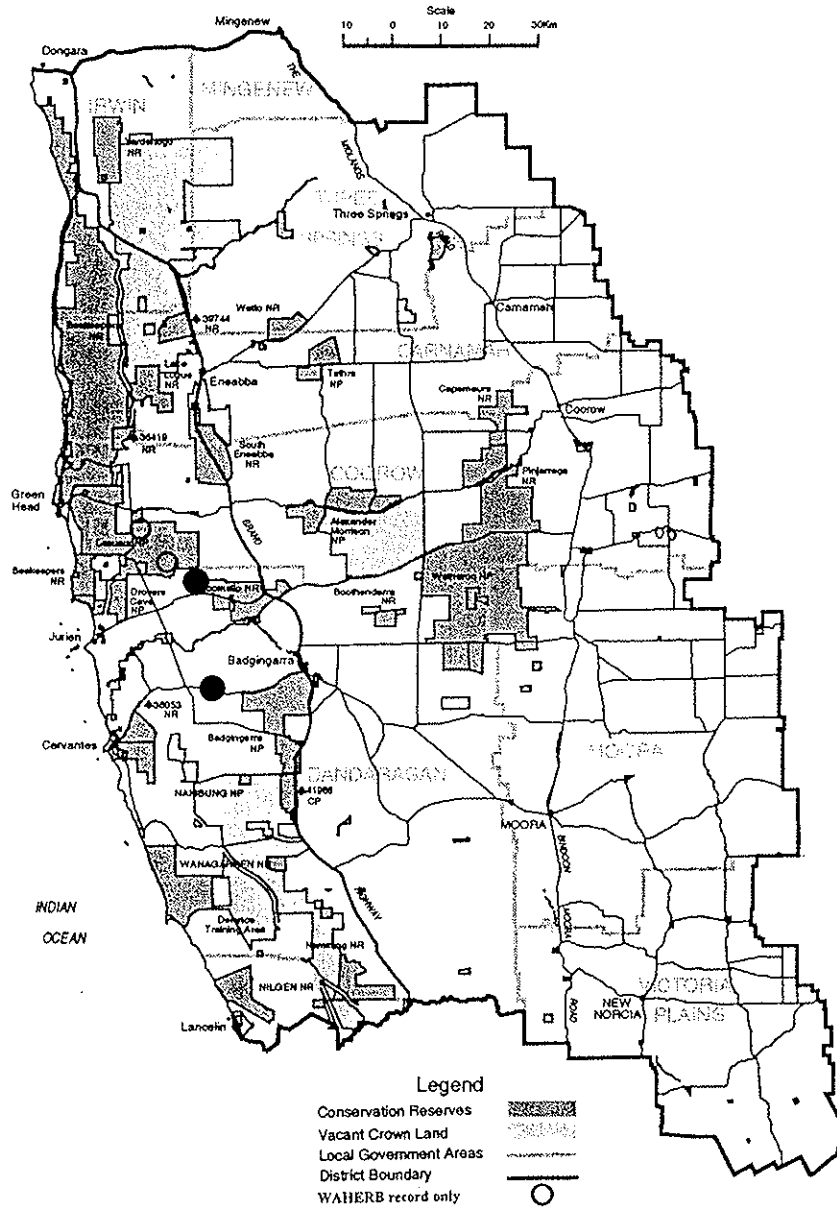
- Ensure that dieback hygiene procedures are carried out at all populations.

#### **Research Requirements**

- Further survey is required to map the full distribution of the species, particularly in the Lesueur area.

#### **References**

Cooke (1984, 1986).



● *Patersonia argyria*

An erect, spreading to almost prostrate shrub to 0.8 m tall with branchlets which are white-tomentose when young. The leaves are glabrous, narrow-elliptic or narrow-oblong and pungent, and sometimes twisted. They are one-nerved, 0.5-15 mm long, and 1-5 mm wide. The flowers are in 1-5 flowered terminal or axillary inflorescences. They are glabrous, and the tubular perianth is symmetrical with four lobes, and is bright yellow in colour. The anthers have no appendage and are shorter than the perianth. The ovary is glabrous and the gynoecium is as long as the stamens.

This species differs from all others in the combination of the characters of anthers without appendages, glabrous tepals, the pungent leaf and the leaf shape and size.

**Flowering Period:** September-December

#### **Distribution and Habitat in the Moora District**

Occurs in the Moora District from Coorow southwards and south-east of the District to Dowerin and Kellerberrin. It occurs on three nature reserves.

Grows in white or grey to yellow sand to loam, in heath and sometimes in very open woodland, usually on flats or lower slopes, often near lakes.

#### **Conservation Status**

Current: Priority 3

#### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Pinjarrega	Co	Nature Reserve	23.8.1992	5+	Undisturbed
2. SW of Coorow	Co	Private	7.1.1992	100+	In area of regeneration after burning and ploughing 5 years previously
3.* Piawaning	VP	-	10.12.1982	-	-
4.* N of Watheroo	-	-	17.12.1980	-	-
5.* SW of Winchester	-	-	9.9.1969	-	-

#### **Response to Disturbance**

Regenerates from a lignotuber after disturbance.

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

Presumed susceptible

#### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

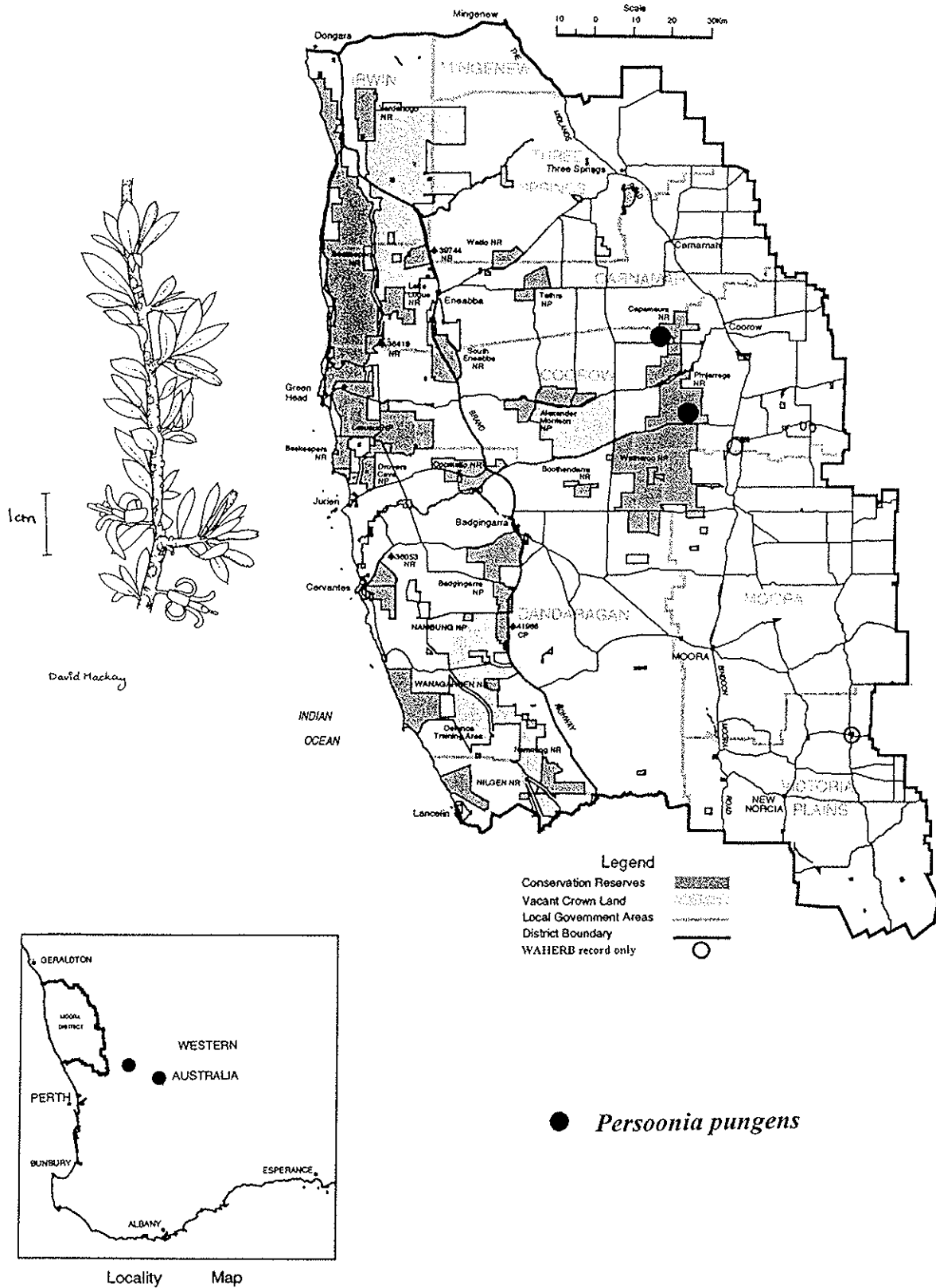
#### **Research Requirements**

- Further survey is required.



References

Fitzgerald (1912), Weston (1994).



● *Persoonia pungens*

An erect shrub to 1 m tall, sometimes somewhat spreading. The leaves are linear, 1.5-4.5 cm long, to 1.4 mm wide. They are densely covered with long hairs when young, less so with age. The leaves are concave, with no prominent veins, and are sometimes grooved on the upper surface. The flowers have a regular perianth, yellow in colour, with hairy tepals. The anthers are yellow and have an appendage. The ovary is densely hairy and the gynoecium is as long as the stamens.

This species is most similar to *Persoonia filiformis* but differs in the long, spreading hairs on the young shoots, non-pungent, unribbed leaves, and exserted gynoecium with a hairy ovary.

**Flowering Period:** October-January

#### Distribution and Habitat in the Moora District

Occurs from north of Eneabba south to the Lesueur area and eastwards to north of Badgingarra. It is reported to occur commonly in the Lesueur area. It also occurs on the southern boundary of the District between Regans Ford and Mogumber, extending south into the Swan Region where it was recorded in 1974 between Muchea and Bullsbrook.

Grows in yellow, grey or white sand or sandy loam and laterite in very open shrub mallee and low scrub, and in open marri woodland in the south of the District.

#### Conservation Status

Current: Priority 3

#### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Eneabba	I	VCL	21.1.1992	-	In burnt heath
2. S of Eneabba	Co	Nature Reserve	6.11.1992	2+	Undisturbed
3.* Cockleshell Gully	D	National Park	22.9.1979	-	-
4.* NNE of Mt Lesueur	D	National Park	11.10.1979	-	-
5. E of Regans Ford	D	Public Utilities Reserve	1991	-	-
6.* N of Coomallo	Co	-	21.10.1966	-	-
7.* Mt Peron	D	-	11.10.1951	-	-
8.* W of Mt Peron	D	-	15.11.1971	-	-
9.* Mogumber	VP	-	11.1930	-	-
10.* W of Three Springs	TS	-	1.11.1974	-	-
11. Alexander Morrison	Co	-	1991	-	-

#### Response to Disturbance

Regenerates after fire (population 1).

#### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

#### Management Requirements

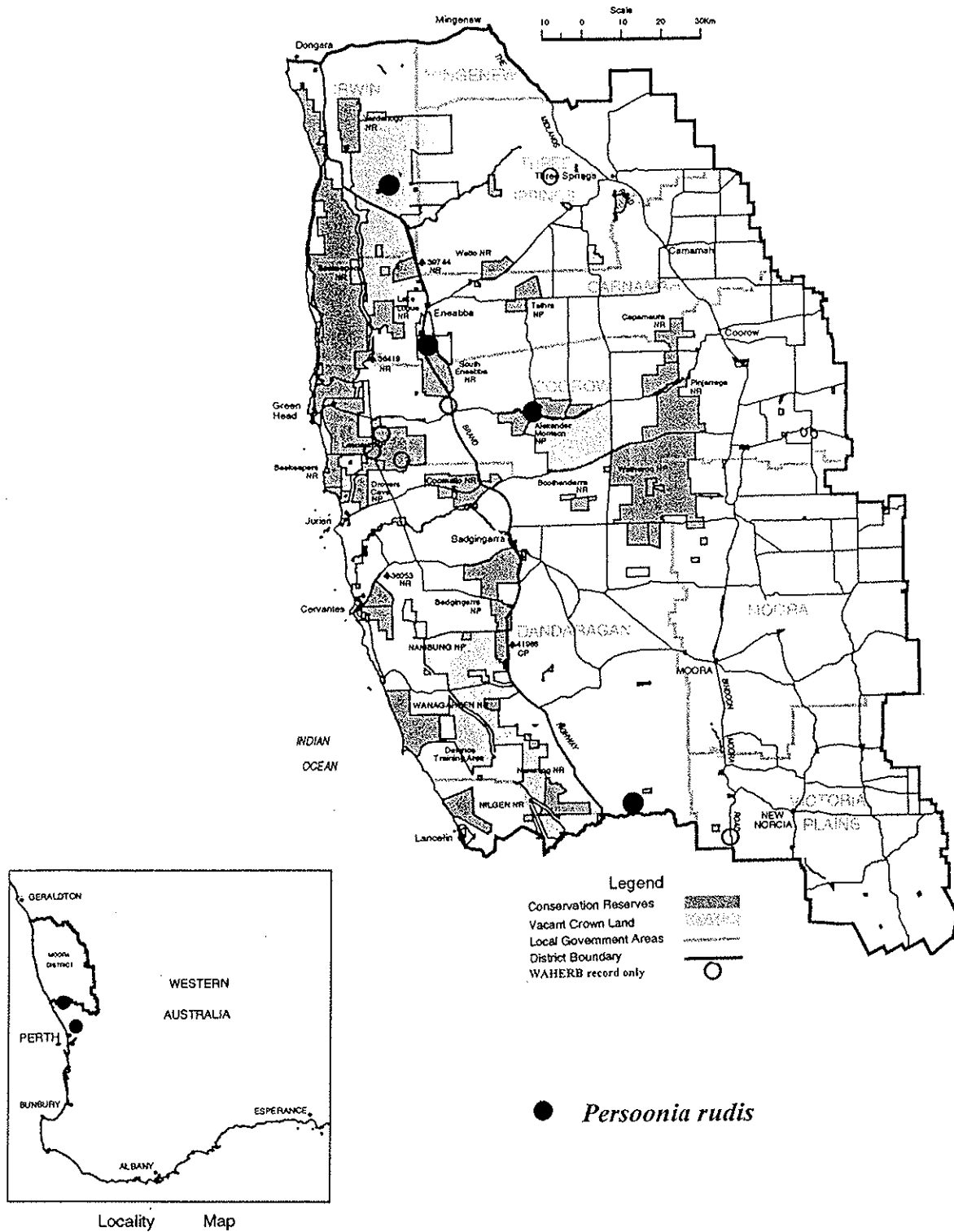
- Ensure that dieback hygiene procedures are carried out at all populations.

## Research Requirements

- Further survey is required in the Lesueur area, also in the area north of Badgingarra and in the south of the District between Regans Ford and Mogumber.

## References

Leigh *et al.* (1984), Weston (1994).



## *Petrophile biternata* Meisn.

## PROTEACEAE

A many-stemmed, rigid shrub to 1.6 m tall. The leaves are mid-green, and rigid, divided pinnately into three or five segments, the lower ones divided again into two or three lobes. The lobes are flat and pungent-pointed, to 4 cm long.

The flowers are cream to yellow, glabrous and viscid, ca. 10 mm long, with an orange pollen presenter. They are grouped in sessile, ovoid, terminal heads. The cone scales are grey and viscid, particularly the outer ones. The inner ones are densely villous with a glabrous tip.

Two taxa described by Sainsbury (1987) as *Petrophile* sp. from east of Jurien and *P.* sp. aff. *biternata* from north of Mogumber are regarded by Foreman (1990) as referable to *P. biternata*.

**Flowering Period:** August-September

### Distribution and Habitat in the Moora District

Occurs from Eneabba and Coorow, south to New Norcia. Grows in lateritic gravel and yellow to grey sand with mallees in shrubland, or in quartzite or pale loam soil, sometimes on slopes or ridges. In the south of the range it grows in open, low woodland of *Eucalyptus wandoo* over low heath or scrub.

### Conservation Status

Current: Priority 3

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Gillingarra	VP	Nature Reserve	9.11.1990	Uncommon-WH	-
2. N of Badgingarra	D	-	1.9.1984	Scattered-WH	-
3. S of New Norcia	VP	-	14.9.1984	Common-WH	-
4. SE of Eneabba	Ca	-	6.9.1984	Common-WH	-
5. N of Eneabba	Ca	-	3.9.1984	-	-
6.* E of Jurien Bay	D	-	18.9.1976	-	-
7.* Between Eneabba and Coorow	Ca	-	24.9.1962	-	-
8.* N of Marchagee	Co	-	29.9.1966	-	-
9.* S of Marchagee	Co	-	31.8.1965	-	-
10.* N of Marchagee	Co	-	5.9.1957	-	-
11.* Moora	Mo	-	30.9.1946	-	-

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Presumed susceptible

### Management Requirements

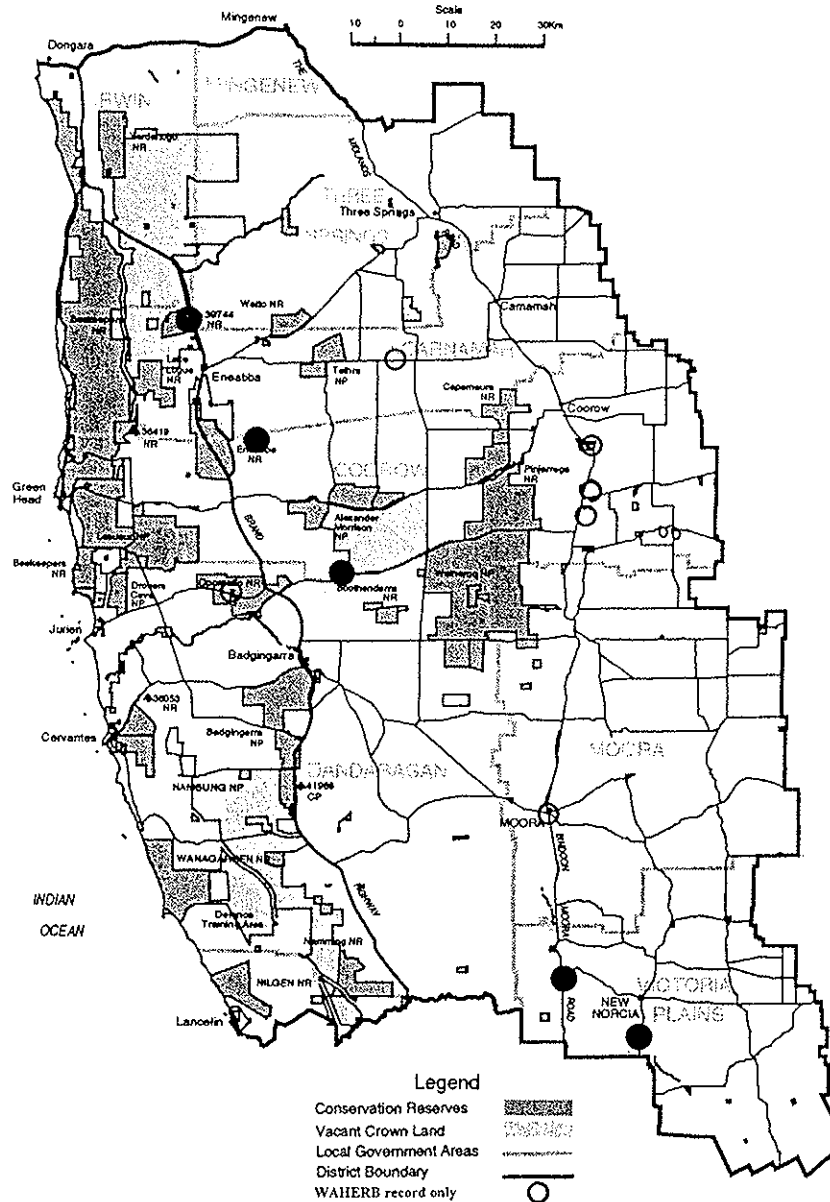
- Ensure that dieback hygiene procedures are carried out at all populations.

## Research Requirements

- Further survey is required, particularly to refind several populations recently reported (R. Sainsbury, personal communication).

## References

Bentham (1870), Foreman (1990), Sainsbury (1987).



● *Petrophile biternata*

## *Petrophile plumosa* Meisn.

PROTEACEAE

An erect shrub to 1.3 m tall with minutely hairy branches. The leaves are linear and spatulate. They are either entire or divided into three flat, pointed lobes. The outer cone scales have white, ciliate margins. The flowers are yellow, in terminal, depressed globular heads. Each flower is ca. 2.5 cm long, very villous. The style has a spindle-shaped pollen presenter.

**Flowering Period:** July-October

### **Distribution and Habitat in the Moora District**

Known from a small area north of Mogumber and to the south-east. There is also an old record from south of Mogumber. The species is represented by large populations on three nature reserves but occurs over a range of less than 25 km.

Grows in loam and laterite on hills, also on lower areas, in shrubland or heath.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. E of Mogumber	VP	Nature Reserve	10.9.1991	50+	Undisturbed
2. Gillingarra	VP	Nature Reserve	8.8.1991	50+	Undisturbed
3. S of Gillingarra	VP	Railway Reserve	1984	1200	-
4. N of Gillingarra	VP	Railway Reserve	1984	500	-
5. Gillingarra	VP	Nature Reserve	1984	3500-4000	-
6. Koodje	VP	Nature Reserve	1984	500	-
7.* Between Mogumber and Gingin	-	-	9.1932	-	-

### **Response to Disturbance**

Unknown

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

Presumed susceptible

### **Management Requirements**

- Monitor populations regularly.
- Ensure that dieback hygiene procedures are carried out at all populations.

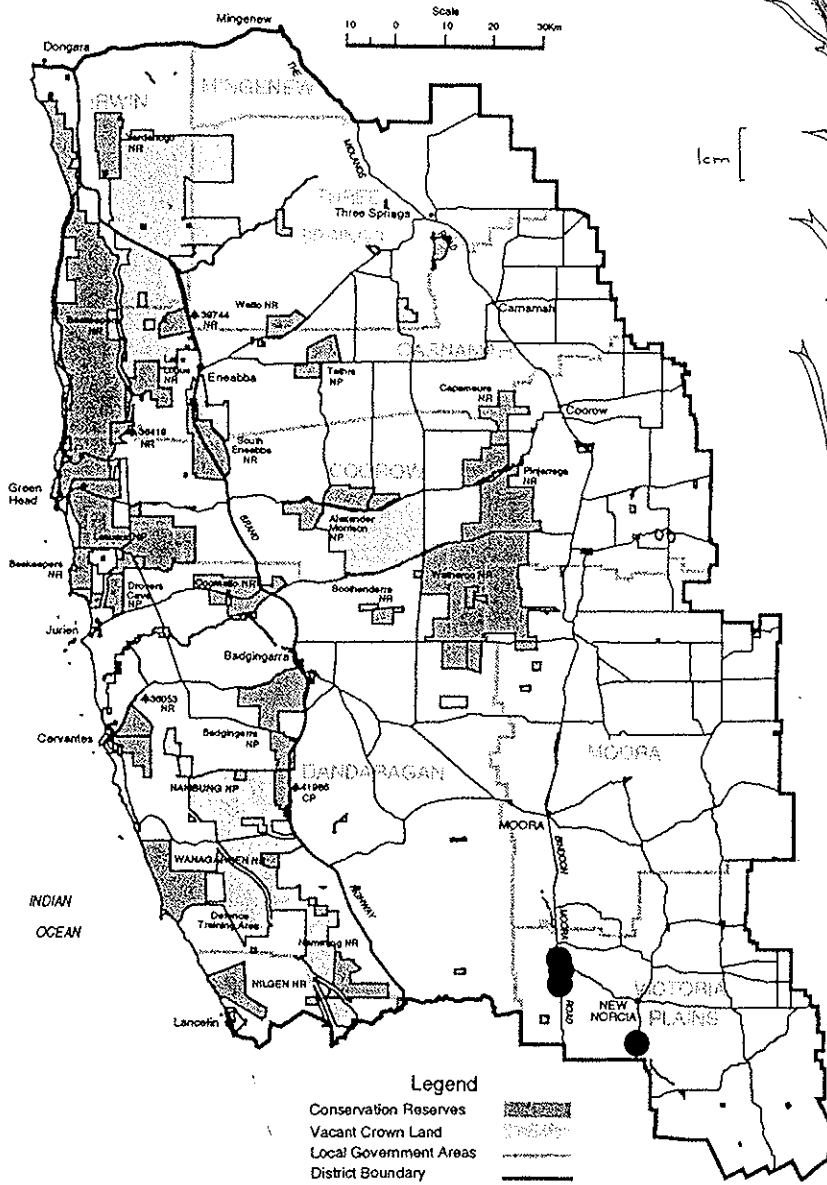
### **Research Requirements**

- Further survey is required.

### **References**

Blackall and Grieve (1988), Sainsbury (1987).

● *Petrophile plumosa*



*Phlebocarya pilosissima* (F.Muell.) Benth. subsp. *pilosissima* HAEMODORACEAE

A tufted perennial herb to 40 cm, with a short stem and leaves to 35 cm long. The larger leaves are flattened, to 2 mm wide and hairy on the margins and usually on both surfaces. The bracts are also hairy along the margins. The flowers are creamy-white in colour, with three petal-like sepals and three petals. There are six stamens with the anther connective somewhat longer than the locules. The style is divided into three at the tip, with three stigmas.

This subspecies differs from sub species *teretifolia* in its flattened, hairy leaves. In the latter, the leaves are terete and glabrous apart from cilia on the margins on the upper 1-2 cm.

**Flowering Period:** August-October

**Distribution and Habitat in the Moora District**

Has been recorded in the past between Eneabba and Dandaragan, although the more recent collections have been from the Badgingarra area. There is also one record from the coastal plain south of Perth.

Grows in white, brown or grey sand over lateritic gravel, on slopes or in depressions between hills. Occurs in low heath, sometimes beneath open, low woodland of *Eucalyptus todtiana* and *Banksia* species. Other associated species include *Hakea prostrata*, *Isopogon linearis* and *Conostylis* species.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Badgingarra	D	Agricultural Research Station Reserve	23.9.1988	-	-
2. Badgingarra	D	National Park	8.10.1985	-	-
3.* Willis Road	Co	-	16.9.1982	-	-
4.* SSE of Eneabba	Co	-	17.10.1981	Common in area-WH	-
5.* Marchagee Track	D	-	15.11.1984	-	-
6.* Hill River	D	-	17.8.1975	-	-
7.* SE of Badgingarra	D	-	10.9.1979	Common-WH	-
8.* E of Cervantes	D	-	8.7.1975	-	-
9.* S of Badgingarra	D	-	2.9.1970	Common-WH	-
10.* WSW of Coorow	Co	-	17.9.1976	-	-
11.* E of Jurien Bay	D	-	2.9.1976	-	-
12.* SW of Badgingarra	D	-	14.10.1978	-	-
13.* S of Eneabba	D	-	13.9.1970	-	-
14.* E of Eneabba	Ca	-	30.9.1966	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Unknown



### Management Requirements

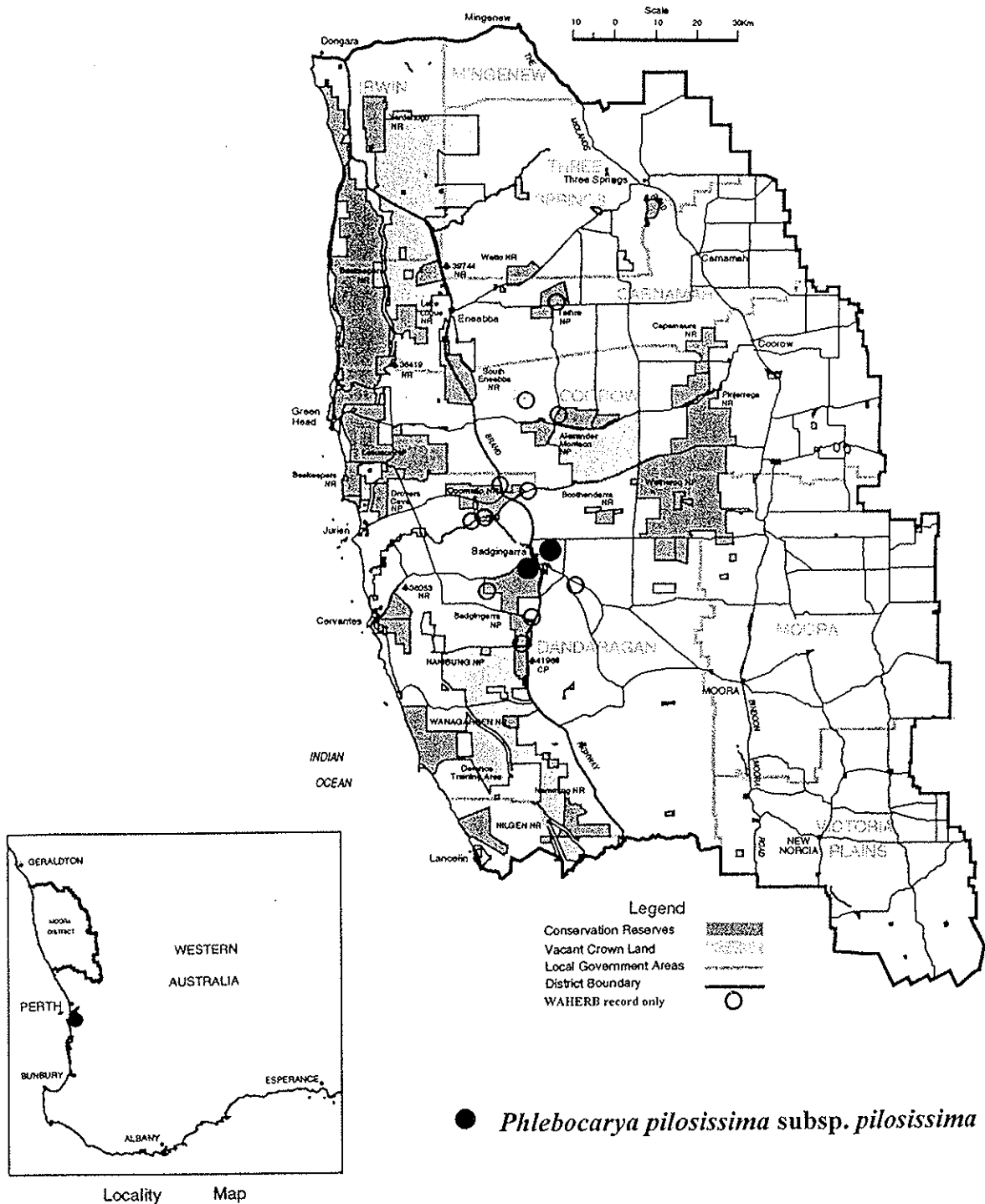
- Ensure that dieback hygiene procedures are carried out at all populations.

### Research Requirements

- Further survey is required, particularly to refind and survey previously recorded populations.

### References

Bentham (1873), Macfarlane (1987).



● *Phlebocarya pilosissima subsp. pilosissima*

## *Rinzia crassifolia* Turcz.

## MYRTACEAE

Although first collected by James Drummond in 1849, there have been few collections since then and the most recent was made in 1983.

*Rinzia crassifolia* is a low open, spreading or prostrate shrub to 20 cm tall and 40 cm in diameter. The leaves are linear to narrow-oblong, 2-9.5 mm long, slightly spreading and scattered on the branches. The flowers are solitary in the axils of the leaves, one to six or up to twelve on each shoot. They are 7.5-11 mm across. The petals are white. There are 10-12 stamens which form a cone around the style. The seeds are verrucose, with rounded ends, dark brown in colour, with an aril.

The verrucose seeds are distinctive within the genus.

**Flowering Period:** August-September

### **Distribution and Habitat in the Moora District**

Occurs from Calingiri north to the Watheroo area. Also occurs outside the Moora District from the Perth area to east of York.

In the south of the range, this species grows on lateritic rises in heath with thickets of *Allocasuarina* species and wandoo. Near Watheroo it has been recorded from sandy soil and chert, beneath scattered *Allocasuarina* species.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.*NW of Watheroo	Mo	-	9.9.1978	Scattered-WH	-
2.*SW of Calingiri	VP	-	8.9.1978	-	-
3.*N of New Norcia	VP	-	18.8.1973	Rare-WH	-
4.*Between Bolgart and Calingiri	VP	-	28.9.1971	-	-
5.*W of Watheroo	Mo	-	9.1926	-	-
6.*Between Moora and Watheroo	Mo	-	13.9.1938	-	-

### **Response to Disturbance**

Unknown

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

Presumed susceptible

### **Management Requirements**

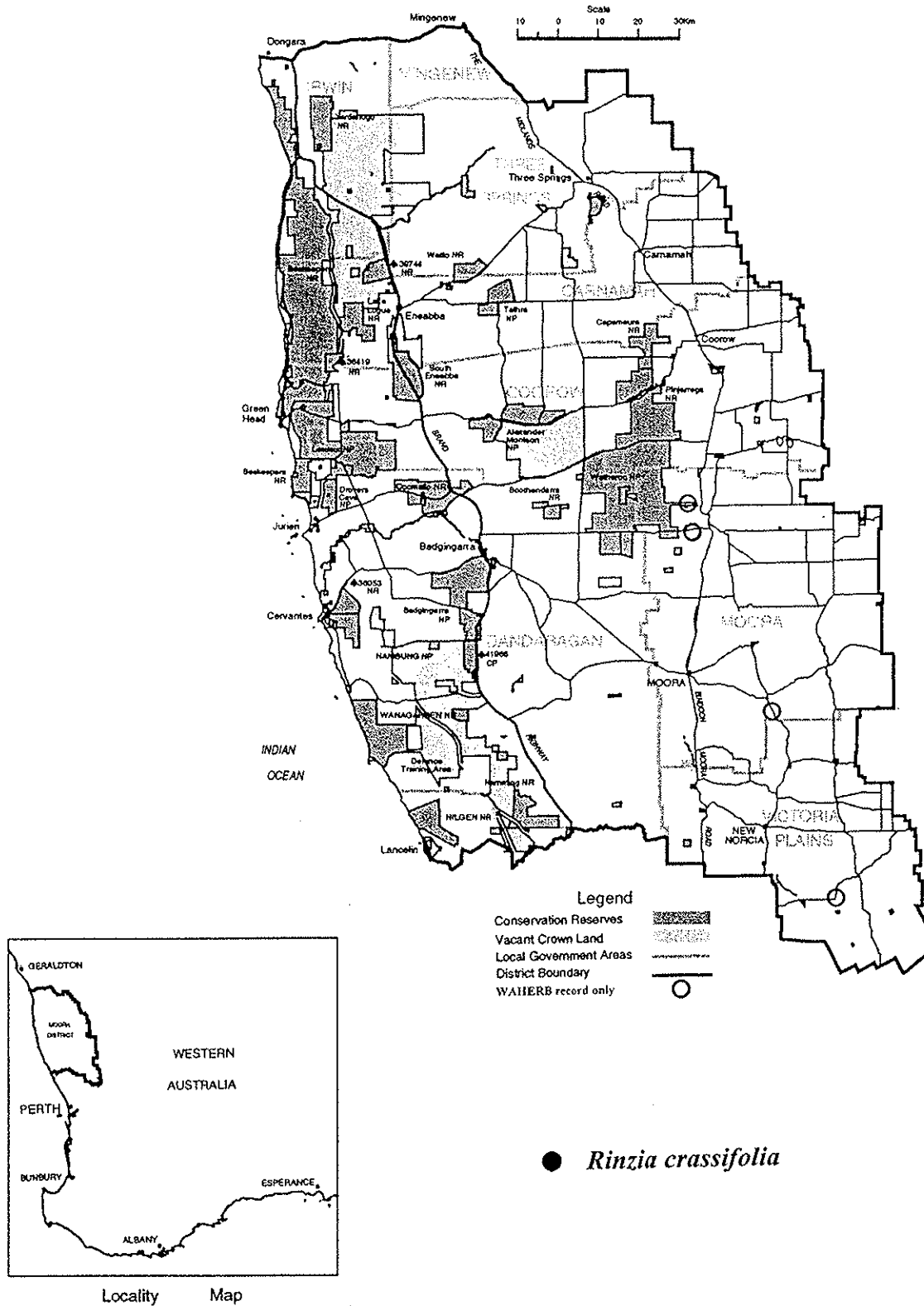
- Ensure that dieback hygiene procedures are carried out at all populations.

### **Research Requirements**

- Further survey is urgently required.

References

Marchant *et al.* (1987), Mollemans *et al.* (1993), Trudgen (1986).



## *Scaevola globosa* (Carolin) Carolin

GOODENIACEAE

[*Nigromnia globosa*]

A prostrate shrub to 70 cm high and 1 m in diameter, covered with a felt-like pubescence of yellowish-white hairs, maturing to grey. The leaves are scattered along the stems. They are obovate to elliptic, 3-6 cm long. The inflorescence is a sessile, globular head in the axil of the leaf, to 15 mm in diameter, with the flowers buried in the mass of soft hairs. Each flower is ca. 3 mm long, the corolla yellow. The fruit is up to 2 mm long, ribbed and hairless.

**Flowering Period:** October-December

### **Distribution and Habitat in the Moora District**

In the Moora District this species occurs between Carnamah and Watheroo. It has also been recorded from north of Mingenew and between Geraldton and Mullewa in the Geraldton District and was described from the original collection made between Yuna and Dartmoor, where it has recently been refound.

Grows in white-grey sand, sandy loam or clay in open shrubland.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. N of Watheroo	Co	Nature Reserve, Private	28.8.1992	5000+	In area burnt 2-3 years previously
2. SSW of Carnamah	Ca	Shire Road Verge	15.11.1990	200+	Plants regrowing on graded road edge
3. SW of Carnamah	Ca	Shire Road Verge, Private	15.11.1990	120	Burnt a few years previously
4. SSW of Carnamah	Ca	Shire Road Verge	15.11.1990	4	Plants partly dead
5. S of Carnamah	Ca	Shire Road Verge	4.10.1990	6	Two plants alive, the remainder dead, senescence

### **Response to Disturbance**

Growth of new plants is stimulated by fire and by soil disturbance.

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

Unknown

### **Management Requirements**

- Monitor known populations.
- Ensure that dieback hygiene procedures are carried out at all populations.

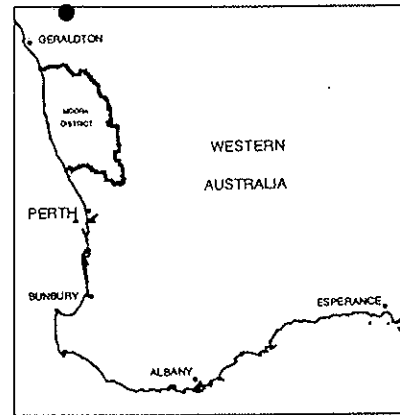
### **Research Requirements**

- Further survey is required on conservation reserves.

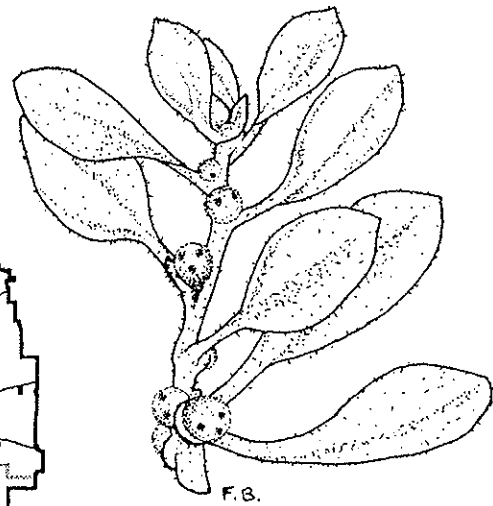
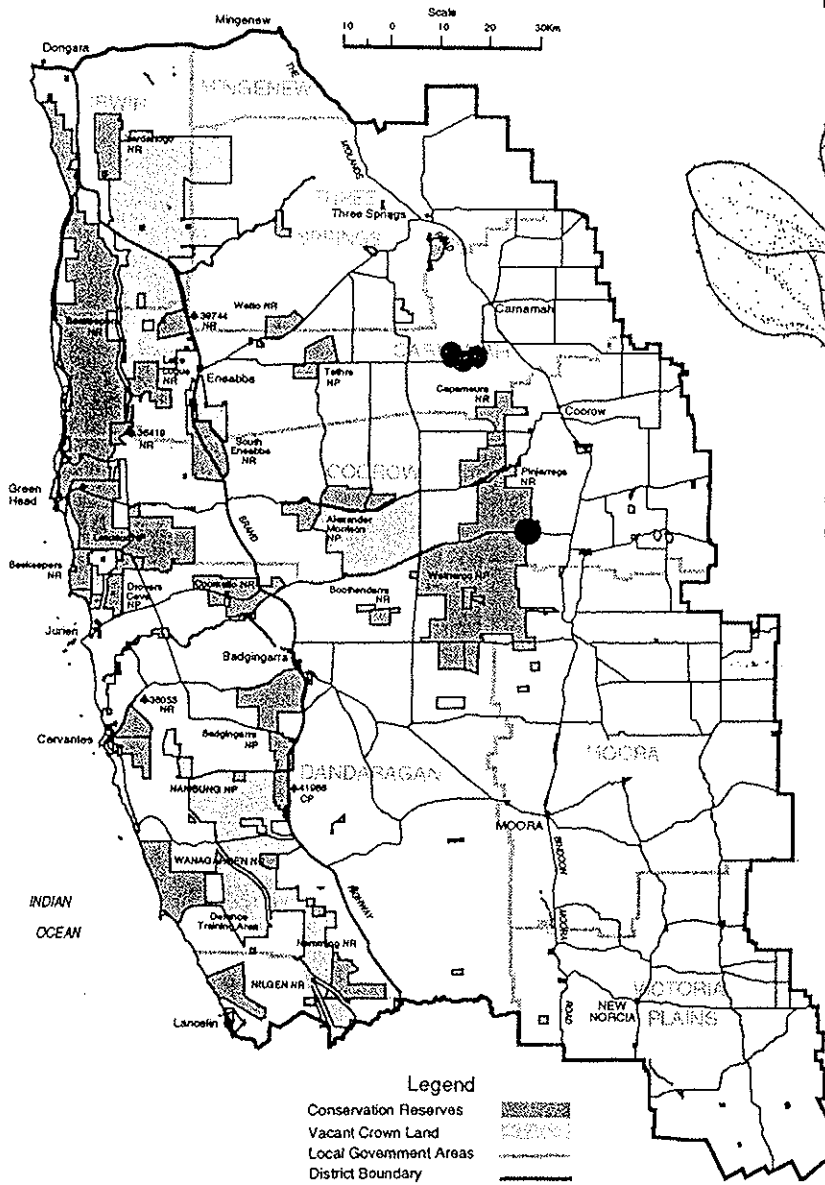
References

Carolin (1974, 1990b, 1992).

● *Scaevola globosa*



Locality Map



1 cm

## *Schoenus benthamii* F.Muell.

## CYPERACEAE

A perennial herb to 45 cm tall, with compressed, ribbed stems, and basal leaves, which are usually shorter than the stems and with a glabrous leaf sheath.

The inflorescence is of one spikelet or of up to ten spikelets which are 13-17 mm long, in a dense, terminal head, with a leaf-like involucral bract which is erect and up to 220 mm long, appearing to form a continuation of the stem. The glumes are usually glabrous. There is only one empty basal glume or there may be none. The perianth segments are flat, white and 2.5-3 mm long. There are three stamens, the anthers are 5-6 mm long. The fruit is a three-ribbed nut.

**Flowering Period:** September-November

### **Distribution and Habitat in the Moora District**

This species is known from Mogumber in the Moora District but also occurs south to the Swan Region and to south of Busselton.

Grows in winter-wet areas in white sand or grey sandy clay over clay in low, open heath. Associated species include species of *Tribonanthes*.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* Mogumber	VP	-	1.1967	-	-

### **Response to Disturbance**

Unknown

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

Unknown

### **Management Requirements**

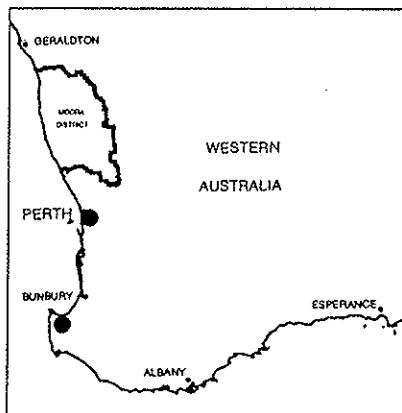
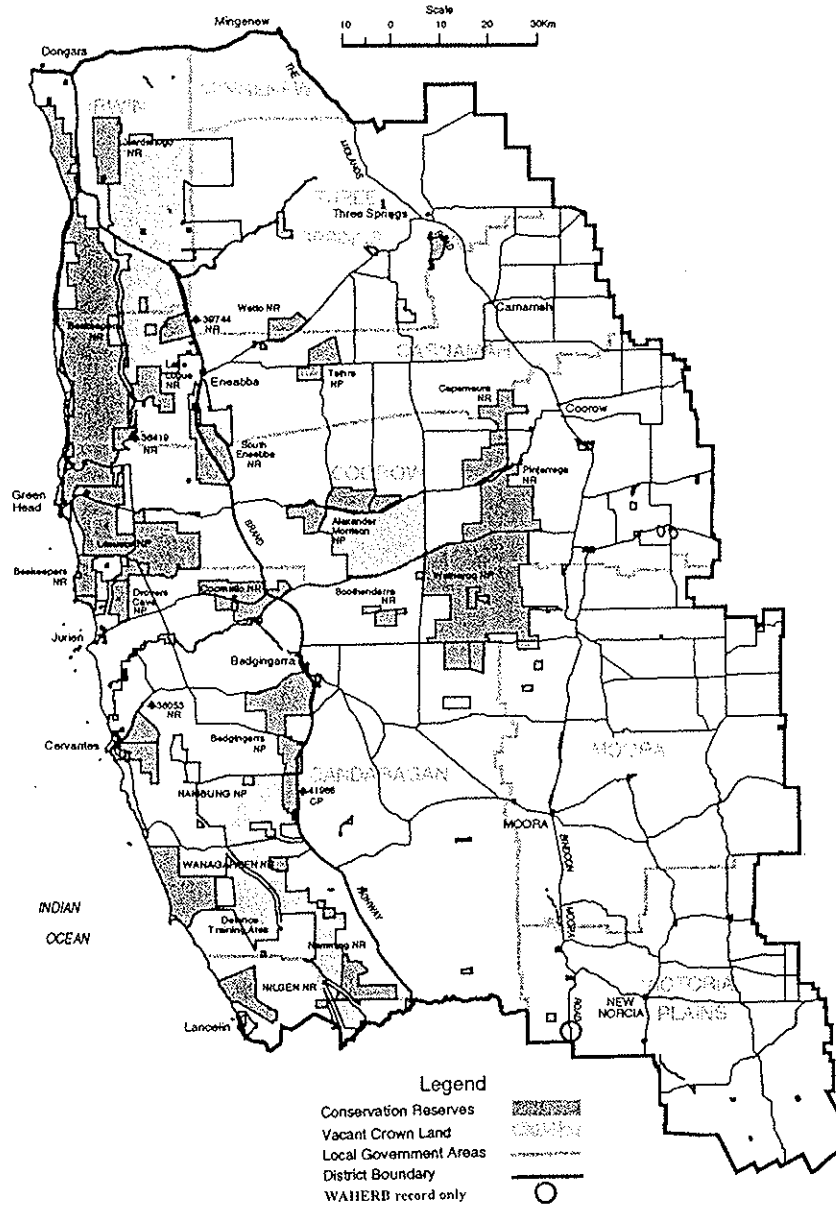
- Ensure that dieback hygiene procedures are carried out at population.

### **Research Requirements**

- Further survey is required.

### **References**

Bentham (1878), Marchant *et al.* (1987).



Locality Map

● *Schoenus benthamii*

## *Stenanthemum reissekii* Rye

RHAMNACEAE

[*Cryptandra* sp. Mt Benia (G.J.Keighery 11080)]

This recently described species, was first collected by Charles Gardner in 1957.

*Stenanthemum reissekii* is an erect to decumbent shrub, to ca. 0.5 m tall, often growing entangled with other shrubs. The leaves are broad at the tip, narrowing towards the base, and are up to 2.4 cm long and 7 mm wide at the broadest point. They are papillate on the upper surface and on the lower surface they are densely clothed with hairs which are rusty in colour on the young leaf, fading with age. The flowers are cream in colour and are clustered in dense heads at the ends of the flowering stems. Each flower cluster is surrounded by broad chestnut bracts fringed with long white hairs. The flowers are ca. 4 mm long, densely hairy on the outside and tubular in shape, with five short spreading lobes, each ca. 2 mm long.

**Flowering Period:** August-October

### Distribution and Habitat in the Moora District

This species is known from a geographical range of ca. 40 km in the area from Jurien Bay to Badgingarra.

Grows in white sand over laterite, brown loam over laterite, yellow sandy loam or lateritic grey sandy gravel. Occurs in low heath or dwarf scrub up to 1 m tall, sometimes in very open low woodland of *Eucalyptus calophylla* or of mallee clumps. It has been collected in upland areas, at the upper edge of a breakaway, on the summit and slopes of mesas, and at the base of a sandstone ridge. Associated species include *Dryandra carlinoides*, *Lambertia multiflora*, *Calothamnus torulosus* and species of *Melaleuca*.

### Conservation Status

Current: Priority 3

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Coomaloo	D	Nature Reserve	18.11.1992	10+	Undisturbed
2. Coomaloo	D	Nature Reserve	11.9.1993	5+	Undisturbed
3. E of Jurien	D	Nature Reserve	21.10.1992	5+	Undisturbed
4. N of Mt Lesueur	D	National Park	6.10.1991	5+	Undisturbed
5. W of Badgingarra	D	National Park	8.10.1991	3+	Undisturbed
6. W of Badgingarra	D	Road Verge	8.10.1991	6+	Undisturbed
7. W of Badgingarra	D	Shire Road Verge	20.10.1992	20+	Partly disturbed
8. E of Badgingarra	D	Townsite Reserve	23.9.1993	-	-
9.* Mt Benia	D	Education Reserve	26.8.1989	Rare in area-WH	-
10.* W of Dandaragan	D	Nature Reserve	27.9.1988	-	-
11.* Mt Lesueur	D	National Park	13.10.1974	-	-

### Response to Disturbance

Unknown

### Susceptibility to *Phytophthora* Dieback

Unknown



### Management Requirements

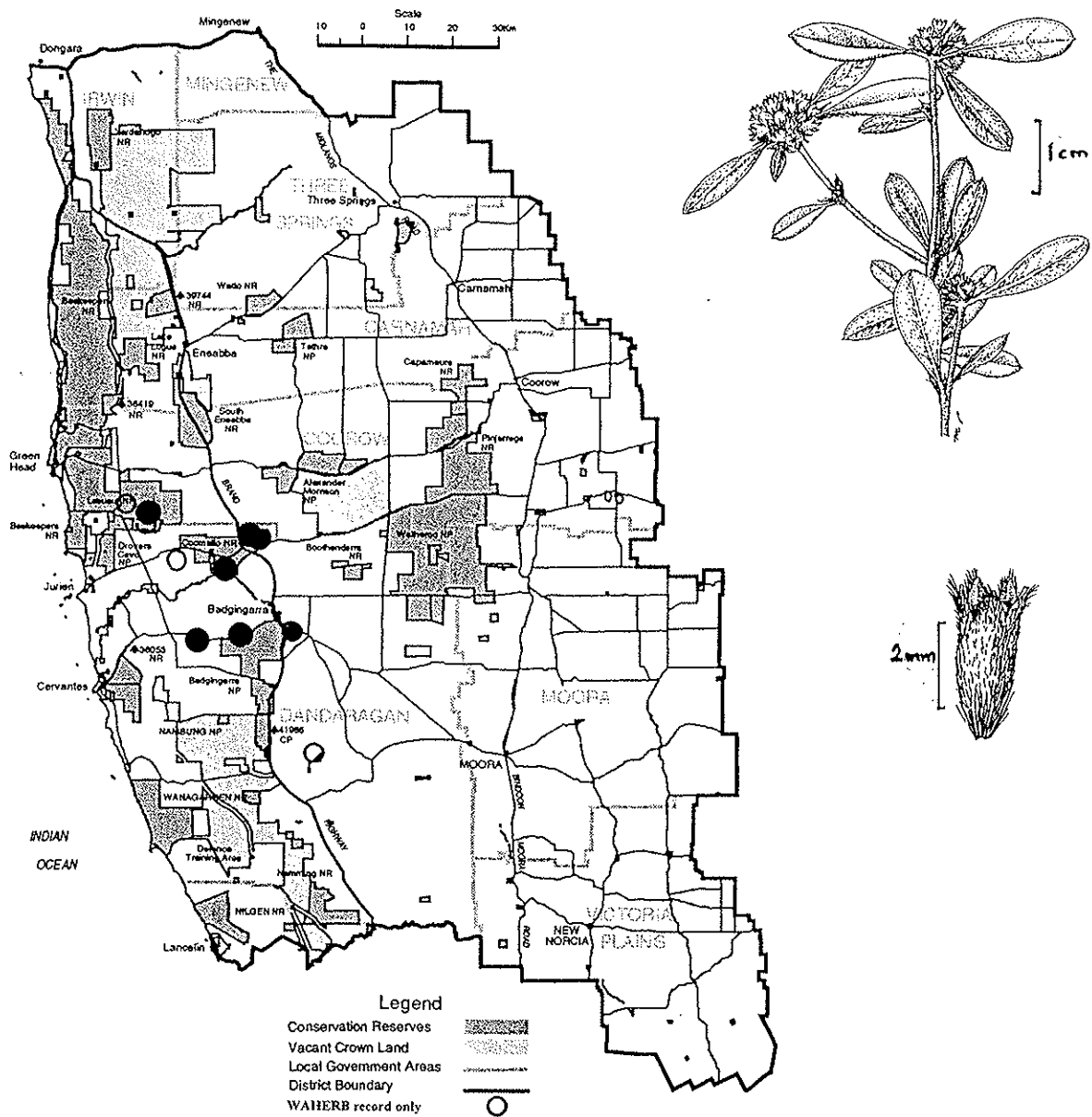
- Ensure that dieback hygiene procedures are carried out at all populations.

### Research Requirements

- Further survey is required.

### References

Rye (1995).



● *Stenanthemum reissekii*

## *Thysanotus anceps* Lindl.

## ANTHERICACEAE

An upright herb to 50 cm tall, with 10-15 channelled, hirsute leaves present only in young plants. The stems are erect and are quadrangular at the base, becoming flattened higher up, and branching 3-4 times. The purple flowers are in terminal umbels. Each has an erect stalk ca. 7 mm long. The six perianth segments are 13-14 mm long. There are six anthers, three of which are 3.5-4 mm long and straight, the other three are 7-8 mm long and curved. All the anthers are twisted and dehisce by terminal pores.

**Flowering Period:** October-December

### **Distribution and Habitat in the Moora District**

In the Moora District this species is known from the Lesueur area south to Dandaragan.

It also occurs in the Perth Region and further east. It grows in lateritic gravel, grey sand over laterite, yellow sandy gravel or white sand over sandstone. In the Moora District it grows in open, low heath and open shrubland, sometimes with *Eucalyptus haematoxylon*. Further south it has been recorded from woodland of *E. marginata* and *E. calophylla*.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* Coomalloo	D	Nature Reserve	7.12.1979	-	-
2.* Mt Peron	D	National Park	23.11.1979	-	-
3.* NW of Mt Lesueur	D	National Park	22.11.1979	-	-
4. Dandaragan	D	Private	1991	-	-

### **Response to Disturbance**

Unknown

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

Unknown

### **Management Requirements**

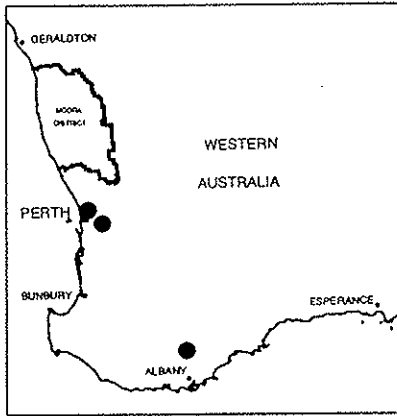
- Ensure that dieback hygiene procedures are carried out at all populations.

### **Research Requirements**

- Further survey is required, particularly to refind all previously recorded populations and complete survey.

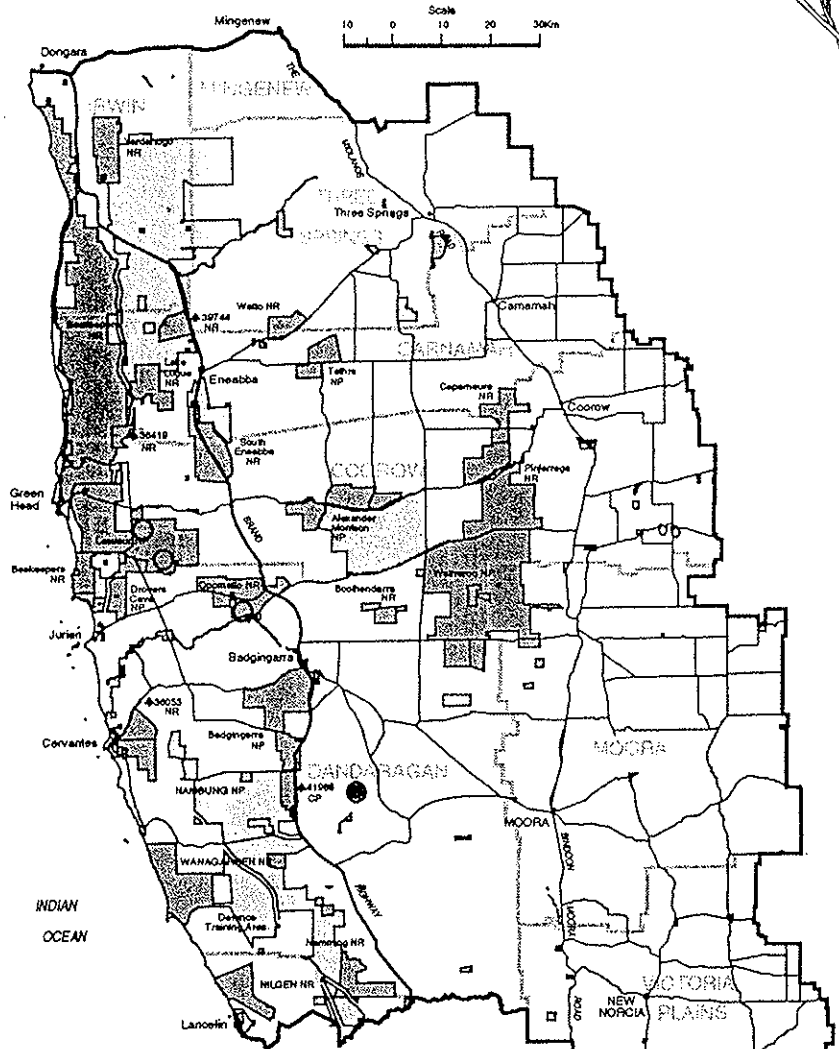
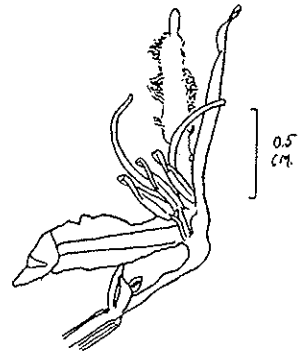
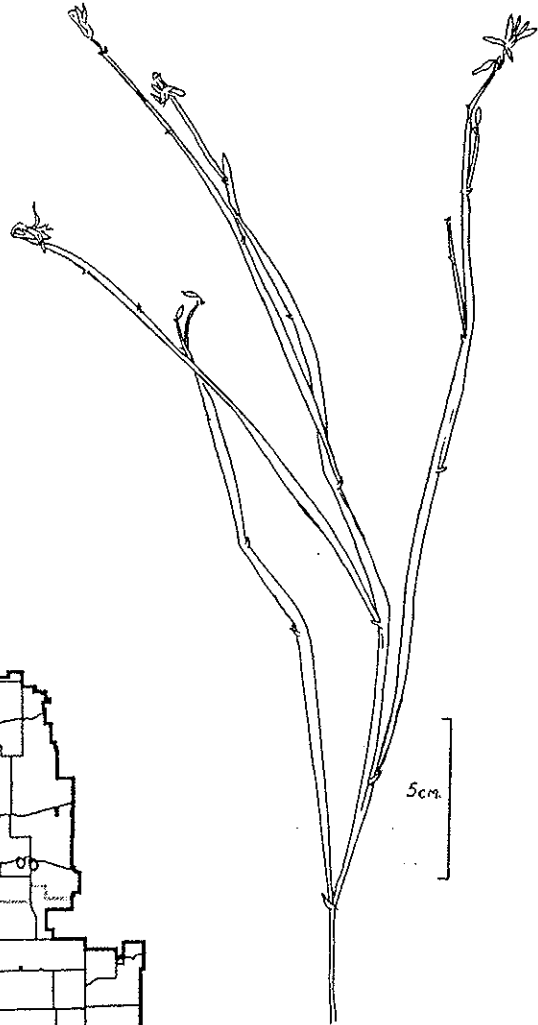
### **References**

Marchant *et al.* (1987).



Locality Map

● *Thysanotus anceps*



**Legend**

- Conservation Reserves
- Vacant Crown Land
- Local Government Areas
- District Boundary
- WAHERB record only

*Verticordia amphigia* A.S.George

MYRTACEAE

An open, branched shrub to 1.3 m tall. The leaves are entire and slender. The bracteoles are persistent, fringed and boat-shaped. The flowers are bright yellow, with 5-7 lobed sepals, which are 2-2.5 mm long and petals which are 2.5 mm long. The anthers are 0.3 mm long. The staminodes are narrowly triangular and lobed and are 1.3-1.7 mm long.

Related to *Verticordia chrysantha* which has broader leaves, larger flowers, broadly linear staminodes, and larger anthers.

The specific name is derived from the Greek *amphigyo*s, meaning pointed at both ends, and refers to the boat-shaped pair of bracteoles beneath each flower, which when dried sometimes resemble pixie ears.

**Flowering Period:** October-November

**Distribution and Habitat in the Moora District**

Occurs south of Eneabba and in the Cockleshell Gully area. All populations are in conservation reserves and are of a reasonable number of plants.

Grows in winter damp sandy loam, clay or gravelly sand in low heath or scrub.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. S of Eneabba	Ca	Nature Reserve	12.9.1985	-	-
2. S of Cockleshell Gully	D	National Park	16.10.1984	-	Young plants in burnt area
3. Cockleshell Gully	D	National Park	16.10.1984	-	-
4. W of Cockleshell Gully Road	D	National Park	16.10.1984	-	Plants regenerating from seed only
5.* Mt Lesueur	D	National Park	1.11.1973	-	-

**Response to Disturbance**

Regenerates from seed after fire.

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

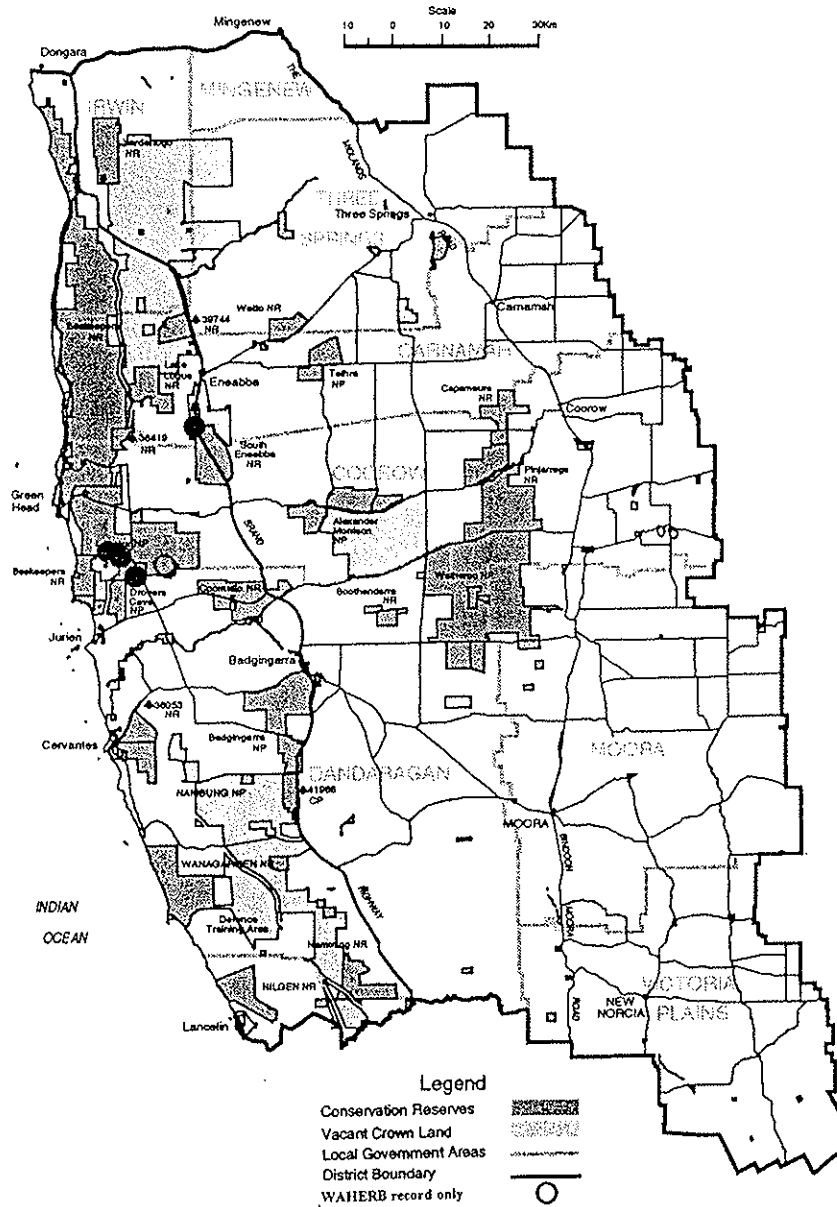
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required, particularly to refind and survey fully all previously recorded populations.

References

George (1991).



● *Verticordia amphibia*

*Verticordia densiflora* var. *roseostella* is an openly-branched shrub to 1.3 m tall with narrowly ovate floral leaves 1.5-2 mm wide. The groups of flowers are small and rounded on stalks 2-4 mm long. The flowers are pink or pink and cream in colour, with sepals which are 2.3-2.6 mm long.

*V. densiflora* var. *roseostella* is distinguished from other varieties of *V. densiflora* by several characters. The pink or pink and cream flowers distinguish it from the most closely related variety *stelluligera* which has yellow or cream flowers and occurs in the same area. Its openly-branched habit and broad floral leaves distinguish it from var. *densiflora* and var. *cespitosa* which both have pink flowers and occur further south.

The varietal name refers to the rose-pink flower colour and its similarity to var. *stelluligera*.

**Flowering Period:** October-December

**Distribution and Habitat in the Moora District**

Occurs in the Three Springs to Mingenew area in the north of the Moora District. This variety extends further north through the Geraldton District to the Kalbarri area.

It grows in deep sand and sand over gravel, in tall shrubland or heath.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. S of Mingenew	TS	-	30.10.1986	-	-
2. Bunny Road	TS	-	17.10.1984	-	-
3.* West Arrino	TS	-	1983	-	-
4.* NE of Three Springs	TS	-	3.10.1980	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

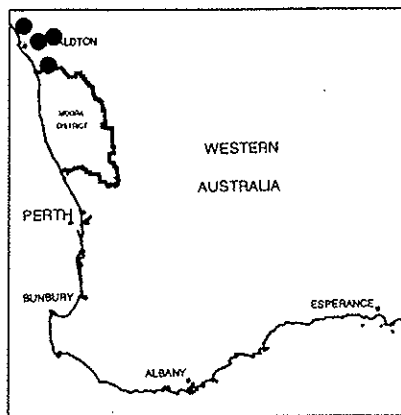
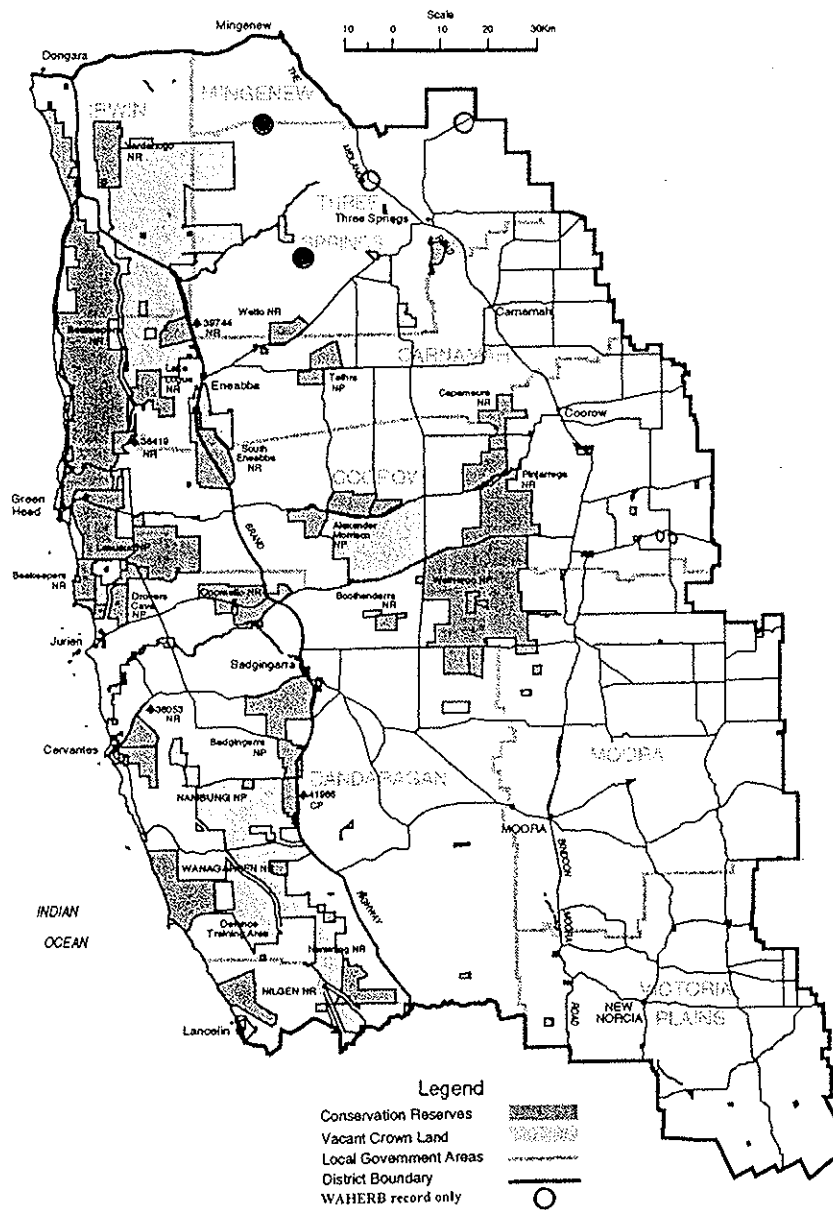
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required.

**References**

George (1991).



Locality Map

● *Verticordia densiflora* var. *roseostella*

A slender shrub to 10 cm high and 30 cm wide with decumbent branchlets and a fire tolerant rootstock. The leaves are 3-6 mm long, 0.4-0.6 mm thick. The creamy-white flowers turn maroon with age. They have sepals which are 7-8 mm long and petals 1.7-1.8 mm long. The staminodes are ovate-lanceolate, acuminate and finely fringed. The style is 5 mm long, with white hairs and a golden yellow stigma.

This variety differs from other varieties of *Verticordia huegelii* in its fire tolerant rootstock, slender habit, decumbent branches and smaller flowers. It flowers later than the typical variety.

**Flowering Period:** Late October-November

**Distribution and Habitat in the Moora District**

A collection thought to be var. *decumbens* has been recorded from the Coorow-Greenhead Road east of the Brand Highway. There is also an earlier collection from Badgingarra. Elsewhere it has been recorded from granite outcrops from the Perth District east to Mount Saddleback, growing in shallow clay loams and gravel near granite in low heath. In the Moora District it is recorded from gravel and clay on gravelly ridges.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Coorow-Greenhead Road	Co	Private	9.1984	-	-
2.* Badgingarra	D	-	4.11.1964	-	-

**Response to Disturbance**

The rootstock is fire tolerant, unlike the typical variety which is killed by fire.

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

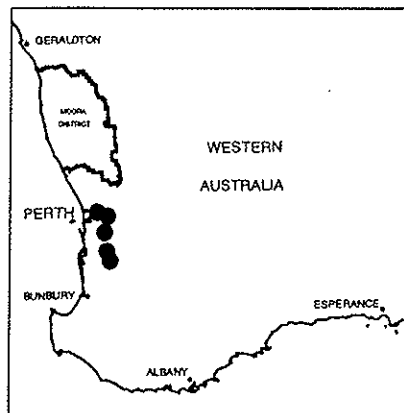
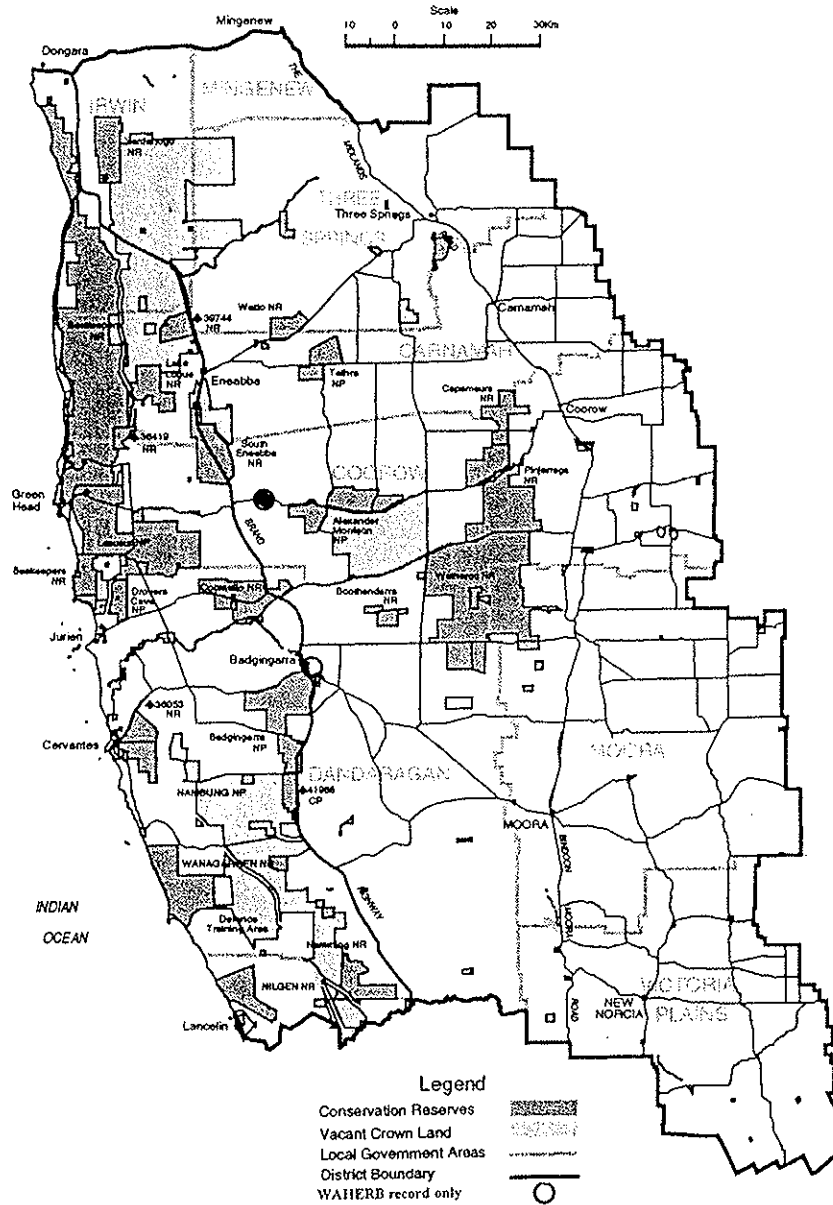
**Research Requirements**

- Further survey is required.

**References**

George (1991).





Locality Map

● *Verticordia huegelii* var. *decumbens*

*Verticordia insignis* Endl. subsp. *eomagis* A.S.George

MYRTACEAE

A slender, upright shrub to 1 m tall, with linear triquetrous leaves to 9 mm long. The flowers are white to pale pink, the petals with dark pink bases, so that the flowers have darker pink centres. The sepals are 7-9 mm long, deeply fringed, the basal reflexed lobes with upturned fringed tips forming a ring around the hypanthium. The petals are 3.5-5 mm long and are also fringed. The stamens are 5-6 mm long and the style is 6-7 mm long.

This differs from other subspecies of *Verticordia insignis* in its larger flowers, which have more concave petals, and the staminodes are pale rather than red. The staminodes have hairs on the inner surface which are very long, almost reaching the style.

**Flowering Period:** September-early November

**Distribution and Habitat in the Moora District**

Occurs between Eneabba and Coorow in the north of the Moora District south to the Badgingarra to Moora area. Grows in white or grey sand over laterite, sometimes on lateritic rises, in heath, sometimes with emergent mallees.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Wandawulla Road	Mo	Gravel Reserve	3.11.1992	-	-
2. Tathra	Ca	-	5.11.1992	Frequent-WH	-
3. N of Mt Lesueur	D	National Park	6.10.1991	20+	Undisturbed
4. SW of Moora	Mo	Shire Road Verge	14.9.1988	-	-
5. Boothendarra	D	Nature Reserve	25.9.1988	-	-
6. Marchagee Track	D	-	13.9.1985	-	-
7. NW of Dandaragan	D	-	31.10.1986	-	-
8.* Coorow Road	Co	-	15.10.1981	-	-
9.* Coorow Road	Co	-	23.10.1981	-	-
10.* Marchagee West Road	D	-	5.10.1981	A few plants only-WH	-
11.* Coorow-Greenhead Road	Co	-	29.10.1981	-	-
12.* S of Coorow-Greenhead Road	Co	-	23.9.1981	-	-
13.* WSW of Winchester	Ca	-	2.10.1980	-	-
14.* E of Brand Highway on Coorow Road	Co	Private	8.1984	Frequent-WH	-
15.* W of Coorow	Co	-	18.10.1981	-	-
16.* Alexander Morrison	Co	National Park	18.11.1978	-	-
17.* W of Coomberdale	D	-	2.11.1974	-	-
18.* Coorow Road	Co	-	19.10.1978	-	-
19.* WNW of Coorow	Ca	-	29.9.1979	Common-WH	-
20.* Mt Peron	D	National Park	26.8.1949	-	-

**Response to Disturbance**

Unknown

## Susceptibility to *Phytophthora* Dieback

Presumed susceptible

## Management Requirements

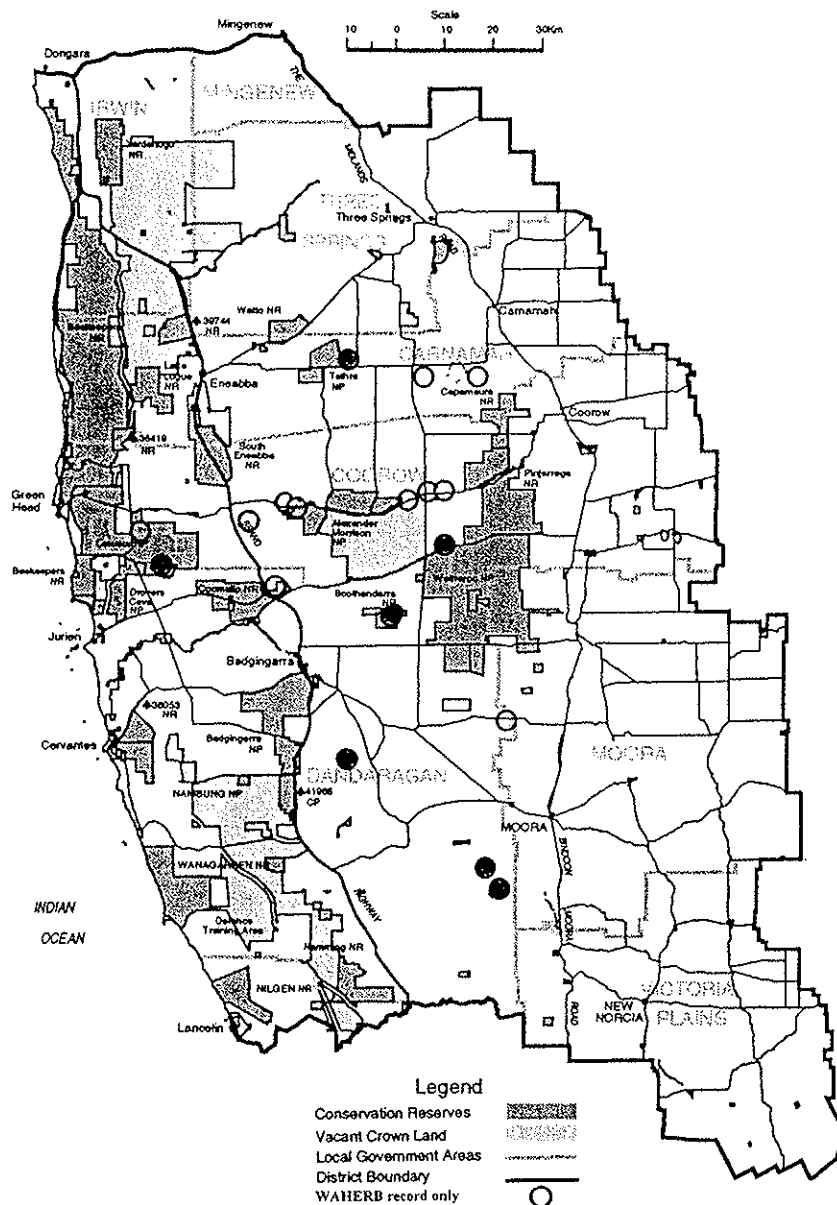
- Ensure that dieback hygiene procedures are carried out at all populations.

## Research Requirements

- Further survey is required, particularly in the conservation reserves from which it has been recorded.

## References

George (1991).



● *Verticordia insignis* subsp. *eomagis*

*Verticordia luteola* A.S.George var. *luteola*

MYRTACEAE

An erect, open shrub to 1 m tall, without a lignotuber. The leaves are elliptic-obovate and concave, with a ciliate margin, and are up to 3.5 mm long. The flowers are spreading, in spikes and are sulphur yellow, or yellow with cream centres, and those in the most northerly population are described as greenish-white. The hypanthium has five green reflexed appendages. The sepals are 5-6 mm long, with 7-9 fimbriate lobes and no basal auricles. The petals are 5-6.5 mm long without basal auricles and the petal fringe is fimbriate. The stamens and staminodes are glabrous, the stamens are 1.5 mm long, the staminodes are narrow, not clubbed. The anthers are oblong, attached basally and opening by slits. The style is bearded below the apex.

Related to *Verticordia bifimbriata* from which it differs in the flower colour, the sepals which have more numerous lobes but lack auricles, the shorter stamens, and the more swollen reflexed appendages on the hypanthium.

**Flowering Period:** November-December

**Distribution and Habitat in the Moora District**

Occurs from south of Dongara to west of Three Springs. Grows in grey sand over gravel, or sandy clay, in open low woodland of *Eucalyptus tottiana*, or open shrubland with *Banksia attenuata* and mallees and heath.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Nebru Road	TS	Shire Road Verge	9.11.1991	60+	Road verge weed infested, some plants growing on edge of road
2. SW of Three Springs	TS	MRWA Road Verge	9.12.1992	5	Undisturbed
3. W of Three Springs	TS	Shire Road Verge	9.12.1992	53	Some disturbance
4. Mt Adams Road	I	Shire Road Verge	9.12.1992	200+	Undisturbed
5. NE of Eneabba	TS	Shire Road Verge	1993	20 est.	-

**Response to Disturbance**

Some young plants at population 1 were growing in the scraped road edge.

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

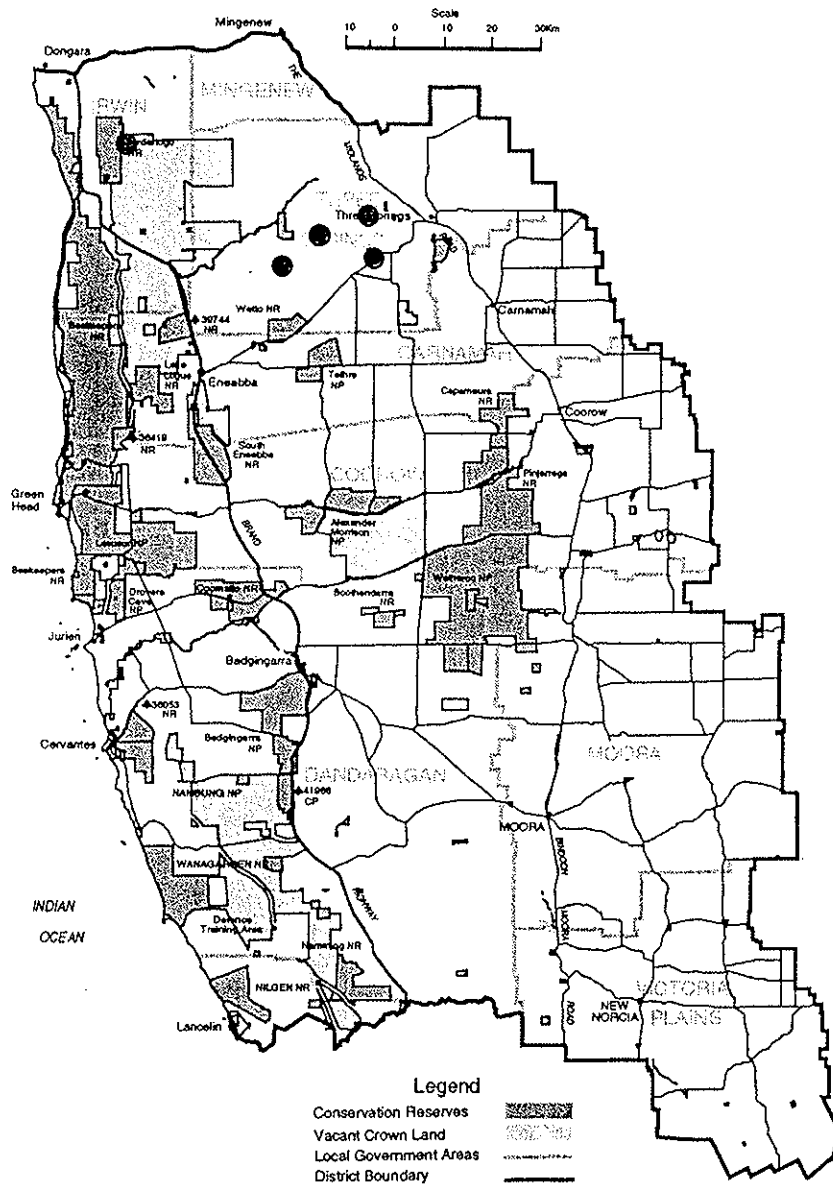
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required, particularly on conservation reserves and VCL within the known range of the species.

References

George (1991).



● *Verticordia luteola* var. *luteola*

*Verticordia muelleriana* E.Pritz. subsp. *muelleriana*

MYRTACEAE

An upright, slender shrub to 2 m with spreading, sparse branches. The leaves are large, orbicular in shape, with a narrow white margin. The flowers are deep red to maroon in colour, fading with age. The sepals are 5 mm long and the fringed petals are 5 mm long including the fringe which is up to 1.5 mm long. The staminodes are very glandular and the style has a curved apex and a beard of hairs to 1.2 mm long, surrounding the style.

This variety is similar to subspecies *minor* which has smaller flowers and shorter style hairs. It occurs east of Geraldton.

**Flowering Period:** Late October-early January

**Distribution and Habitat in the Moora District**

Occurs from south of Three Springs to Coorow and Watheroo, with one record from south of Dalwallinu in the Merredin District.

Grows in deep yellow, grey or white sand or sandy loam in tall shrubland. Associated species include *Banksia prionotes*, *Xylomelum angustifolium*, *Verticordia densiflora* and *Actinostrobus* sp.

**Conservation Status**

Current: Priority 3

**Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. Marchagee	Co	Nature Reserve	27.1.1994	200+	Undisturbed
2. SW of Carnamah	Ca	Shire Road Verge, Private	8.1.1992	10+	Undisturbed
3. Dookanooka	TS	-	11.12.1988	-	-
4. E of Carnamah	Ca	-	17.10.1984	-	-
5. W of Coorow	Co	-	9.1984	-	-
6.* Namban West Road	Mo	Private	14.12.1982	-	-
7.* SW of Coorow	Co	-	29.10.1981	-	-
8.* S of Coorow	Co	Nature Reserve	16.1.1982	-	-
9.* WSW of Winchester	Ca	-	22.11.1980	Occurs over a wide area-WH	-
10.* W of Marchagee	-	-	1.11.1982	2	-
11.* N of Marchagee	Co	-	5.12.1978	-	-
12.* SE of Coorow	Co	-	25.11.1959	-	-

**Response to Disturbance**

Unknown

**Susceptibility to *Phytophthora* Dieback**

Presumed susceptible

**Management Requirements**

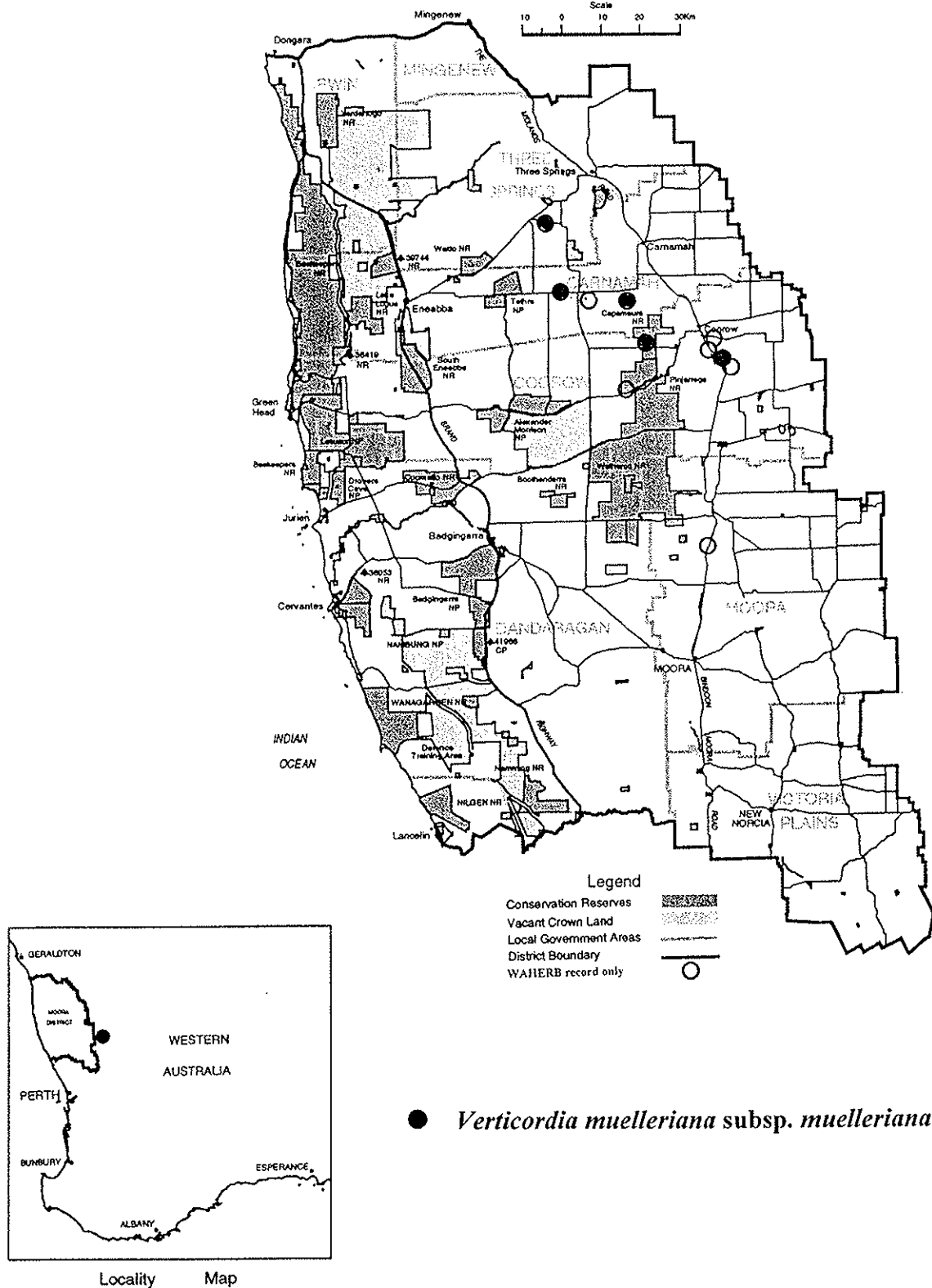
- Survey fully the large population known on a nature reserve.
- Ensure that dieback hygiene procedures are carried out at all populations.

**Research Requirements**

- Further survey is required.

**References**

George (1991).



## *Verticordia rutilastra* A.S.George

## MYRTACEAE

An erect shrub to 70 cm tall. The leaves are linear, almost terete. The flowers are in corymb-like groups and are bright yellow, ageing to red or bronze from the centre of the flower. The bracteoles are united and persistent. The sepals are 4.5-5 mm long and the petals are lobed and are 4 mm long. The stamens have a divided appendage and are 0.5-1 mm long. The staminodes are fringed and the style is 0.2 mm long.

This species is closely related to *Verticordia grandiflora* and *V. nobilis*. However, it differs in its smaller flowers, more fringed and smaller staminodes and in the shorter style.

The specific name refers to the appearance of the flower as it ages, turning red (from the Latin *rutilus*, red with a metallic lustre) and the star-like appearance of the flower as the petals change in colour first (from the Latin *aster*, a star).

**Flowering Period:** October-November

### Distribution and Habitat in the Moora District

Occurs from the Lesueur area and south-west of Coorow south to the Dandaragan area.

Grows in white or grey sand or sandy loam over laterite or sandstone, in heath and open mallee heath, with *Eucalyptus tetragona*, *Xanthorrhoea drummondii*, *Dryandra*, *Melaleuca* and *Beaufortia* species.

### Conservation Status

Current: Priority 3

### Populations Known in the Moora District

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1. S of Koonah Road	D	Private	31.10.1986	-	-
2. NE of Mt Lesueur	D	-	15.10.1984	-	-
3. Coorow-Greenhead Road	Co	-	29.9.1985	-	Area burnt 5-6 years ago
4. Coorow-Greenhead Road	Co	-	31.10.1985	-	-
5. N of Cockleshell Gully	D	-	16.10.1984	-	-
6. S of Warradarge Hill	Co	Private	16.10.1984	-	-
7. E of Mt Lesueur	D	-	15.10.1984	-	-
8.* N of Coomalloo	Co	Private	16.10.1981	-	-
9.* Marchagee West Road	D	-	5.10.1981	A few plants only-WH	-
10.* Coorow-Greenhead Road	Co	Public Recreation Reserve	18.11.1978	2	-
11.* Badgingarra	D	-	9.1965	-	-
12.* W of Moora	D	-	3.11.1954	-	-

### Response to Disturbance

Population 3 had regenerated after fire with single and multiple upright stems.

### Susceptibility to *Phytophthora* Dieback

Presumed susceptible



### Management Requirements

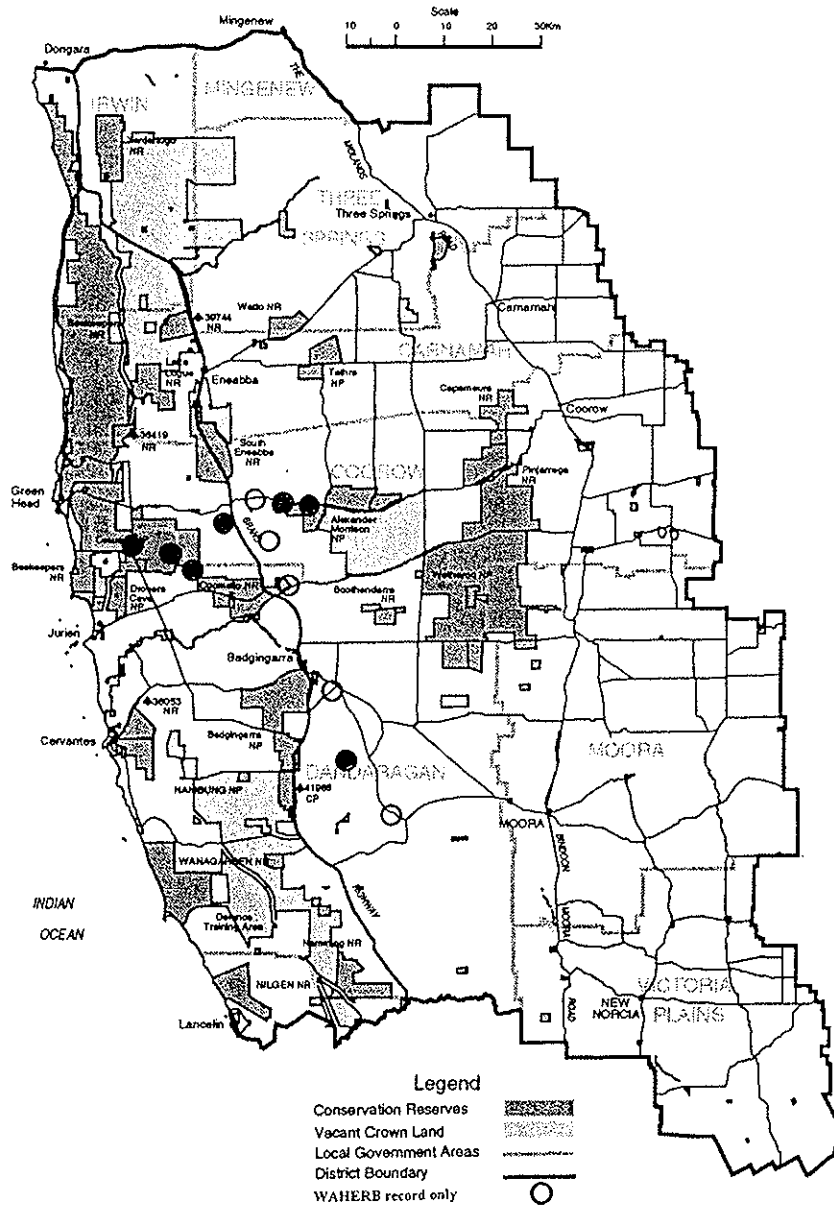
- Ensure that dieback hygiene procedures are carried out at all populations.

### Research Requirements

- Further survey is required, particularly in conservation reserves within the range of the species.

### References

George (1991).



● *Verticordia rutilastra*

## *Walteranthus erectus* Keighery

## GYROSTEMONACEAE

An erect, soft green shrub to 1.7 m tall, with linear to elliptic leaves which are semi-succulent, held erect, 5-8 cm long, 4-7 mm wide. The flowers are either male or female and are borne on the same plant, the female flowers singly towards the ends of the branches and the male flowers in a terminal raceme. There are 9-12 stamens in a single whorl on the small, pedicellate male flowers. The female flower is sessile in a leaf axil. It is globular, ca. 2 mm in diameter and the stigma has 2-4 lobes, 3-4 mm long. The fruits are barrel-shaped, indehiscent and woody, 7-9 mm in diameter.

**Flowering Period:** September

### **Distribution and Habitat in the Moora District**

Occurs in the Eneabba to Jurien Bay area, where it grows in sand over limestone.

### **Conservation Status**

Current: Priority 3

### **Populations Known in the Moora District**

Population	Shire	Land Status	Last Survey	No. of Plants	Condition
1.* Stockyard Gully	Ca	-	27.2.1974	-	"after fire"
2.* Eneabba Flora Reserve	Ca	-	12.9.1963	-	-
3.* N of Cockleshell Gully	D	-	16.9.1957	-	-
4.* S of Greenhead	Co	-	-	-	-

### **Response to Disturbance**

Population 1 was recorded as occurring after fire.

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

Unknown

### **Management Requirements**

- Ensure that dieback hygiene procedures are carried out at all populations.

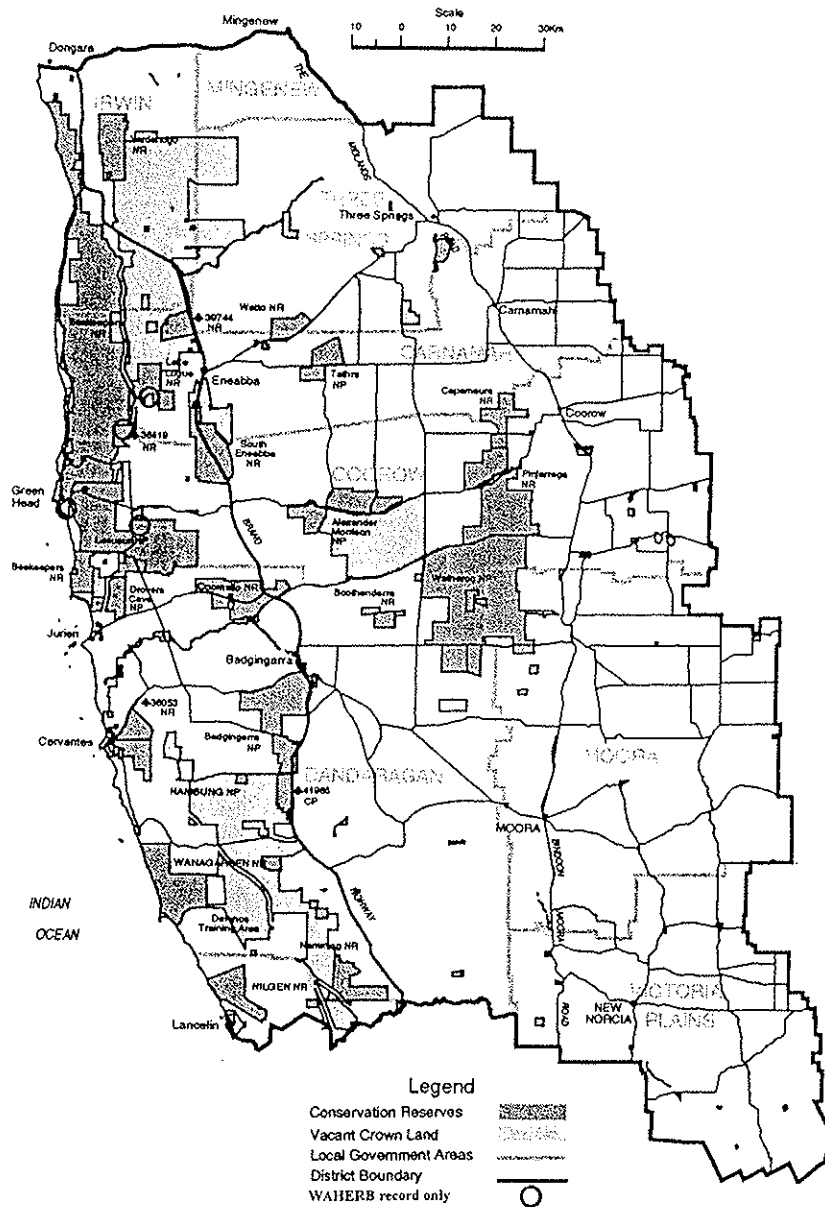
### **Research Requirements**

- Further survey is urgently required.

### **References**

Keighery (1985).

Illustration by G. Keighery.



*Walteranthus erectus*

## PART FOUR: THE PLAN FOR MANAGEMENT

The objective of this Wildlife Management Program is to ensure and enhance, by appropriate management, the continued survival in the wild of populations of Declared Rare Flora and other plants in need of special protection.

### 1. Determining Priorities

Part Two assesses the abundance and conservation status of each Declared Rare Flora taxon within the Moora District and makes recommendations for protection, research and management. On the basis of these recommendations, each taxon was ranked on a scale of 0 to 3 under 19 categories recognised as potential threats or management and research requirements (Table 1). Taxa with no threat or urgency for management and research action were given a score of 0. Those with a high degree of threat were allocated a score of 3. The scores were summed for each of the 54 taxa and for each threat/requirement category. Table 1 summarises the perceived threats, and management and research requirements for each Declared Rare Flora in the District.

Table 2 lists the 54 Declared Rare Flora in priority order according to the urgency of their requirement for protection and management action. Taxa with a high ranking score are most threatened and/or most in need of action. It is intended that all requirements for each taxon, as outlined in the previous species treatments, will be implemented. Work will be conducted, programmed or deferred according to priority, available funds and existing resources and workloads. Attention is directed to Table 2 to determine which taxa should have priority for management actions. This will enable resources and staff within the Moora District to be allocated where most urgently required.

Taxa most in need of attention for a particular management or research requirement can be determined from Table 1.

Ranking the categories illustrates which threats/requirements are the most critical in the Moora District. The Table indicates those taxa that are (or may be) threatened by particular activities, in addition to providing for continued research and management once requirements listed for the critically threatened taxa are fulfilled.

### 2. Management and Research Actions

Overall rankings of threatened taxa based on the 19 categories of threat, management requirements and research requirements (Table 1) are shown in Table 2. These data suggest that the following taxa warrant immediate management and research action:

<i>Acacia vassalii</i>	<i>Gastrolobium hamulosum</i>
<i>Acacia</i> sp. Dandaragan	<i>Grevillea calliantha</i>
<i>Chamelaucium griffinii</i>	<i>Grevillea christineae</i>
<i>Conostylis micrantha</i>	* <i>Grevillea pythara</i>
<i>Daviesia bursarioides</i>	<i>Hemiandra gardneri</i>
<i>Daviesia speciosa</i>	<i>Hemiandra</i> sp. Watheroo (S.Hancocks 4)
<i>Eremophila nivea</i>	<i>Stawellia dimorphantha</i>
<i>Gastrolobium appressum</i>	<i>Verticordia albida</i>

\* Located on border of Moora District within Merredin District but was not included in the Management Program for that District, who will carry out management actions.

Specific management or research actions for all threatened flora in the Moora District are outlined below.

(i) Fungal Disease

Little research information is currently available to assess the impact of the soil-borne pathogens, *Phytophthora* species, on Declared Rare Flora in the Moora District. Since the discovery of dieback near Cataby in 1986, infections involving five species of *Phytophthora* have been located by the Northern Sandplains Dieback Working Party, mainly on the sandplains on the western side of the District from the southern boundary north to the Eneabba area. Most infections are small and localised. Plants not destroyed by direct infection may be affected indirectly by structural and ecological changes in the affected vegetation. Disturbances such as road construction are known to promote the spread of the disease, particularly in moist, relatively low-lying sites unless carried out under strictly controlled hygiene conditions. Urgent research on the impact of dieback on Declared Rare Flora is required and all work at their populations and in native vegetation should observe hygiene procedures.

The Moora District Dieback Protection Plan (1990) divides the District into three dieback hazard zones. The degree of hazard to which a taxon may be subjected, according to the location of its populations within these zones, has been used to rank the taxa as well as the degree of susceptibility of the individual taxon.

Taxa which may be at risk from *Phytophthora* are:

*Asterolasia drummondii*  
*Banksia tricuspis*  
*Daviesia speciosa* ms

*Dryandra mimica*  
*Dryandra serratuloides*

(ii) Survey

Further survey of suitable habitat for new populations is a requirement for many of the Declared Rare Flora in the Moora District. Some taxa are in need of urgent attention, either because of the small number or size of known populations, or their poor representation in conservation reserves. Some are in need of resurvey of known populations which have not been visited within the last ten years, or where insufficient data are available.

Taxa in most urgent need of further survey are:

*Acacia* sp. Dandaragan  
*Chamelaucium griffinii*  
*Eucalyptus balanites*  
*Eucalyptus dolorosa*  
*Grevillea batrachioides*

*Grevillea pythara*  
*Hemiandra* sp. Watheroo  
*Ptychosema pusillum*  
*Stawellia dimorphantha*  
*Verticordia albida*

(iii) Population Size and Few Populations

A number of Declared Rare Flora are known from few populations or have very small population sizes, making them particularly vulnerable to localised disturbance. The total number of populations for each taxon, including those occurring outside the District was taken into consideration.

Taxa at risk through low numbers in some or all of their known populations, or which are known from one population only are:

*Acacia vassalii*  
*Acacia* sp. Dandaragan  
*Chamelaucium griffinii*  
*Darwinea carnea*  
*Dryandra mimica*  
*Eucalyptus absita*  
*Eucalyptus balanites*  
*Eucalyptus dolorosa*  
*Eucalyptus leprophloia*  
*Eucalyptus rhodantha* var. *petiolaris*

*Grevillea batrachioides*  
*Grevillea pythara*  
*Hemiandra gardneri*  
*Hemiandra* sp. Watheroo  
*Hensmania chapmanii*  
*Ptychosema pusillum*  
*Spirogardnera rubescens*  
*Stawellia dimorphantha*  
*Verticordia albida*

(iv) Transport Corridors

Populations located near roads, railways and firebreaks are vulnerable to damage or destruction by maintenance operations. Such activities in the vicinity of Rare Flora populations require careful monitoring. Approximately 110 populations, over a quarter the total number of populations of Declared Rare Flora in the Moora District occur on, or partly on, road and to a lesser extent, rail reserves. Most of these reserves are narrow and can be affected, both directly and indirectly, by the use and nature of adjoining lands. Threats include weed invasion, periodic grazing, drift of chemical sprays and fertilisers, fenceline maintenance and periodic burning. The vegetation on road reserves can also be affected by rubbish dumping, uncontrolled vehicle access, wildflower picking and camping.

The majority of road reserves are vested in local authorities or Main Roads W.A., and rail reserves in Westrail. Accidental damage can occur during road works such as maintenance operations (grading, weed control), drainage works, road/rail upgrading, metal dumps and sand/gravel extraction.

Other utilities such as power-lines, water pipelines and Telstra lines generally follow road and rail reserves, so that any maintenance, upgrading or management of these utilities close to known populations can damage plants. This can be in the form of mechanical damage by machinery and equipment, or by chemicals used to control weeds around poles or along pipelines.

Management and field personnel within Shires and government agencies need to know where the populations of Declared Rare and Priority Flora occur to avoid accidental destruction of plants. This is carried out currently by notification letters from CALM and the use of linear markers in the field. See (xvii).

The following taxa are most threatened:

<i>Acacia vassalii</i>	<i>Grevillea calliantha</i>
<i>Acacia</i> sp. Dandaragan	<i>Grevillea christineae</i>
<i>Anigozanthus humilis</i> subsp. <i>chrysanthus</i>	<i>Grevillea pythara</i>
<i>Conostylis micrantha</i>	<i>Hensmania chapmanii</i>
<i>Daviesia bursarioides</i> ms	<i>Restio chaunocoleus</i>
<i>Daviesia speciosa</i> ms	<i>Spirogarnera rubescens</i>
<i>Dryandra serratuloides</i> subsp. <i>serratuloides</i>	<i>Stawellia dimorphantha</i>
<i>Eremophila nivea</i>	<i>Verticordia albida</i>
<i>Gastrolobium appressum</i>	

(v) Short-lived Disturbance Opportunists

Some taxa are favoured by disturbance, either because they cannot compete with associated species in undisturbed vegetation or disturbance is essential for recruitment. Included in this category are taxa favoured both by fire and by physical disturbance of the soil such as occurs when road edges are graded or firebreaks are ploughed. A population which no longer exists as adult plants is considered to be present in the soil as a seed bank, awaiting suitable disturbance to promote seedling growth, unless the population site has become degraded and is now unlikely to support the population.

Taxa in this category, which present special management difficulties, are:

<i>Anigozanthos humilis</i> subsp. <i>chrysanthus</i>	<i>Hemiandra</i> sp. Watheroo
<i>Anigozanthos viridis</i> subsp. <i>terraspectans</i>	<i>Paracaleana dixonii</i> ms
<i>Hemiandra gardneri</i>	<i>Stawellia dimorphantha</i>

(vi) Land Acquisition

Acquisition of land by the Department, either by donation, exchange or purchase, is required for those taxa not well represented on conservation reserves. This would enable appropriate management and protection practices to be implemented on land maintained, as much as possible, in a natural state. Plants occurring on land reserved for nature conservation are generally considered to be less threatened than those on land designated for other purposes. It should be noted, however, that presence on a reserve contributes to, but does not guarantee,

population survival. Reserves are subject to threats such as weed invasion, disease infection, drought, altered drainage and water tables, uncontrolled fires and where approved, mining activities.

Negotiations are currently under way for acquisition of some sites within the District. Where land is not available for this purpose, other alternatives (e.g. establishment in suitable habitats in reserves) need to be considered.

The following are priority taxa for land acquisition:

<i>Acacia</i> sp. Dandaragan	<i>Eucalyptus dolorosa</i>
<i>Chamelaucium griffinii</i> ms	<i>Grevillea calliantha</i>
<i>Darwinia acerosa</i>	<i>Grevillea pythara</i>
<i>Darwinia carnea</i>	<i>Hemiandra gardneri</i>
<i>Daviesia bursarioides</i> ms	<i>Stawellia dimorphantha</i>
<i>Eremophila nivea</i>	<i>Verticordia albida</i>

(vii) Fencing

Declared Rare Flora populations on private property are often on farmland where they require protection from grazing by domestic stock. In some situations landholders themselves have excluded stock, and in others CALM has provided fencing materials as part of formal agreements.

Rabbits are also a widespread problem, particularly on sandy soils and granite outcrop areas.

The following taxa require protection from grazing, either by fence construction or agreement with landowners to exclude stock from population localities:

<i>Banksia tricuspis</i>	<i>Eucalyptus pruiniramis</i>
<i>Darwinia carnea</i>	<i>Gastrolobium appressum</i>
<i>Dryandra mimica</i>	<i>Gastrolobium hamulosum</i>
<i>Eremophila microtheca</i>	<i>Grevillea calliantha</i>
<i>Eucalyptus absita</i>	<i>Grevillea pythara</i>

(viii) Mining

Mineral sand mining occurs in the District particularly in the Eneabba and Cataby areas, in both of which Declared Rare Flora and Priority taxa occur. Mining activities which may affect Declared Rare Flora include exploration (clearing of survey lines and drilling operations), spread of *Phytophthora*, actual mine site establishment, provision of services (road-making, power) and increased recreation activity by mine workers. Close liaison between companies, CALM, the Department of Minerals and Energy, the Department of Environmental Protection and the Environmental Protection Authority is essential.

Other forms of mining in the District include gravel/sand mining by local authorities and extraction of bentonite from lakes in the Watheroo area. Oil is extracted from an area now north of the District but included within it when the Program began. This has affected a road verge population of *Conostylis micrantha*, which is adjacent to an access road.

Coal mining was proposed in the Lesueur area in 1989 and part of the impact zone would have affected the eastern section of the now Lesueur National Park, where populations of several Declared Rare Flora are located. (Burbidge and van Leeuwen 1990).

Taxa most at risk are:

<i>Anigozanthus viridis</i> subsp. <i>terraspectans</i>	<i>Leucopogon obtectus</i>
<i>Daviesia speciosa</i> ms	<i>Stawellia dimorphantha</i>
<i>Eucalyptus balanites</i>	

(ix) Recreation

A number of taxa in the District are located at sites where they are actually or potentially at risk from recreational activities. These may include camping, bushwalking and off-road vehicle use. Risk may be from trampling, picking or the spread of *Phytophthora* species. Taxa occurring in high profile situations (e.g. along major highways) where they may be subject to picking, are also included in this category. Recreation should be controlled or excluded from sensitive sites depending on the degree of threat. Provision of fencing may be necessary. Work has been undertaken in the Lesueur National Park to allow access in the most suitable areas to prevent recreational activities from causing such damage.

The following taxa need to be monitored to ensure that they will not need protection from some aspect of recreational damage:

<i>Asterolasia nivea</i>	<i>Hemiandra gardneri</i>
<i>Chamelaucium griffinii</i>	<i>Paracaleana dixonii</i> ms
<i>Eremophila nivea</i>	<i>Ptychosema pusillum</i>
<i>Eucalyptus rhodantha</i>	<i>Spirogardnera rubescens</i>
<i>Grevillea calliantha</i>	<i>Thelymitra stellata</i>

(x) Habitat Degradation

There are a number of threats that may cause habitat degradation to populations of Declared Rare Flora both on conservation reserves and on other lands. For example, exposure and reduced water availability has been found to be an important factor affecting some taxa, particularly those growing in shallow soils. Other causes of habitat degradation are the rise in water table, and salinity.

Taxa which appear to be at risk due to habitat degradation in these categories are:

<i>Drakonorchis drakeoides</i>
<i>Dryandra serratuloides</i> subsp. <i>perissa</i>
<i>Dryandra serratuloides</i> subsp. <i>serratuloides</i>

(xi) Ex situ Germ Plasm Collections

Collection and long term storage of germ plasm (seed or tissues) from wild populations of Declared Rare Flora provides a source of propagation material for future re-establishment, in addition to ensuring protection of populations, or more importantly, taxa, from extinction. Collection should be carried out according to the protocols provided by the Threatened Flora Seed Centre at the Western Australian Herbarium.

Priority for collection of this material will depend upon the degree of threat to the taxon. The majority of species in the District are not represented in *ex situ* germ plasm collections.

Those taxa which are represented by few populations and/or low individual numbers are of highest priority:

<i>Chamelaucium griffinii</i> ms	<i>Hemiandra</i> sp. Watheroo
<i>Grevillea batrachioides</i>	<i>Ptychosema pusillum</i>
<i>Grevillea pythara</i>	<i>Stawellia dimorphantha</i>

(xii) Re-introduction

Taxa poorly represented on conservation reserves may need to be considered for re-establishment in suitable, less vulnerable habitats on land designated for nature conservation.

Taxa most urgently requiring re-establishment into the wild by CALM staff under approved Wildlife Management Programs or Interim Management Guidelines as outlined in CALM Policy Statement No. 29 are:

<i>Grevillea pythara</i>
<i>Hemiandra gardneri</i>
<i>Verticordia albida</i>



(xiii) Liaison

Many Declared Rare Flora populations occur on or adjacent to land not managed by CALM. This requires close association and cooperation with private landowners, local authorities, land managers and government agencies (e.g. Western Power, Westrail and Main Roads W.A.) to ensure their continued survival. Departmental staff are required to provide advice and assistance, regarding conservation and management, to landholders and other agencies with Declared Rare Flora populations on land under their control. Landowners are requested to arrange their operations so that the area will not be destroyed or damaged in any way.

Critical taxa for staff liaison with landowners are:

<i>Acacia vassalii</i>	<i>Gastrolobium hamulosum</i>
<i>Acacia</i> sp. Dandaragan	<i>Grevillea calliantha</i>
<i>Conostylis micrantha</i>	<i>Grevillea christineae</i>
<i>Darwinia acerosa</i>	<i>Grevillea pythara</i>
<i>Darwinia carnea</i>	<i>Hemiandra gardneri</i>
<i>Daviesia bursarioides</i>	<i>Hensmania chapmanii</i>
<i>Drakaea elastica</i>	<i>Ptychosema pusillum</i>
<i>Dryandra mimica</i>	<i>Stawellia dimorphantha</i>
<i>Eremophila nivea</i>	<i>Stylidium scabridum</i>
<i>Eucalyptus dolorosa</i>	<i>Verticordia albida</i>
<i>Eucalyptus rhodantha</i> var. <i>rhodantha</i>	<i>Wurmbea tubulosa</i>
<i>Eucalyptus rhodantha</i> var. <i>petiolaris</i>	

(xiv) Monitoring

Where possible, all populations in the Moora District should be inspected annually to observe fluctuations in population numbers and to monitor changes in the habitat. Where detrimental changes are seen, this should be followed by appropriate management actions. Species which require most frequent monitoring are those likely to be affected by factors such as weed invasion, accidental damage, drought, fungal disease and those disturbance opportunists which decline rapidly after the initial disturbance event.

A network of permanent monitoring quadrats should be established on populations of the most threatened taxa of Declared Rare Flora within the District. Through the detailed mapping of individual plants in small populations, and permanent sample plots for smaller species and larger populations, subsequent surveys can provide information on population dynamics, plant longevity and regeneration. Monitoring quadrats require annual inspection.

The following taxa are the highest priority for annual monitoring:

<i>Acacia vassalii</i>	<i>Gastrolobium hamulosum</i>
<i>Chamelaucium griffinii</i>	<i>Grevillea christineae</i>
<i>Conostylis micrantha</i>	<i>Grevillea pythara</i>
<i>Daviesia bursarioides</i> ms	<i>Hemiandra gardneri</i>
<i>Drakonorchis drakeoides</i>	<i>Hemiandra</i> sp. Watheroo
<i>Eremophila nivea</i>	<i>Verticordia albida</i>

(xv) Research

Only a few of the Declared Rare Flora within the Moora District have been subject to detailed studies. Research into the taxonomy, genetic systems, population biology and ecology of the other taxa is needed to determine the best means of protecting and managing populations and particularly if re-introduction is considered necessary. Response to fire, drought tolerance, susceptibility to *Phytophthora* species and other introduced pathogens and impact of exotic bees on native pollinators (particularly of members of the Orchidaceae) require special attention. Taxa currently being researched in some detail include *Darwinia carnea*, *Daviesia bursarioides*, *D. speciosa*, *Drakaea elastica*, *Dryandra mimica*, *Eremophila nivea*, *Eucalyptus absita*, *E. argutifolia*, *E. impensa*, *Grevillea calliantha*, *G. christineae*, *G. pythara* and *Stylidium scabridum*.

The following taxa are most urgently in need of research:

Population Biology and Breeding Systems

*Acacia* sp. Dandaragan  
*Darwinia carnea*  
*Daviesia bursarioides* ms  
*Daviesia speciosa* ms  
*Dryandra mimica*  
*Drakaea elastica*  
*Drakonorchis drakeoides*  
*Eremophila nivea*  
*Eucalyptus absita*  
*Eucalyptus dolorosa*  
*Eucalyptus impensa*  
*Eucalyptus lateritica*  
*Grevillea pythara*  
*Hemiandra gardneri*

Plant Diseases

*Asterolasia drummondii*  
*Banksia tricuspis*  
*Hakea megalosperma*

Fire Response

*Chamelaucium griffinii* ms  
*Hemiandra* sp. Watheroo  
*Spirogardnera rubescens*

Taxonomic

*Eremophila microtheca*  
*Eucalyptus argutifolia*

(xvi) Linear Marking

Populations in need of linear marking are generally located along linear reserves (road and rail reserves) and firebreaks and are often associated with utilities such as powerlines, water pipelines and Telstra lines. In all these situations they are vulnerable to damage or destruction by maintenance operations. Permanent, but discreet, marker pegs need to be installed at all Declared Rare Flora populations occurring along linear routes within CALM land. Main Roads W.A. has developed a field marking system for demarcating environmentally significant areas on road reserves. CALM uses this system to mark DRF and Priority Flora populations along linear routes both on CALM land and on other areas. Local Shires have been encouraged to adopt such a system.

Taxa with populations on CALM and other lands most urgently in need of linear marking are:

<i>Acacia vassalii</i>	<i>Gastrolobium hamulosum</i>
<i>Anigozanthos viridis</i> subsp. <i>terraspectans</i>	<i>Grevillea christineae</i>
<i>Daviesia speciosa</i> ms	<i>Hemiandra gardneri</i>
<i>Eucalyptus johnsoniana</i>	<i>Hemiandra</i> sp. Watheroo
<i>Gastrolobium appressum</i>	<i>Spirogardnera rubescens</i>

(xvii) Environmental Weeds

Control of weeds in and near Rare Flora populations on CALM land should be conducted by District staff. The following taxa most urgently require weed control or eradication in some or all of their populations.

*Eremophila nivea*  
*Grevillea christineae*  
*Grevillea pythara*

(xviii) Fire Regimes

All populations of Declared Rare Flora should be excluded from prescribed burns on CALM and other lands until appropriate research has been carried out and then only be burnt in accordance with specific fire regimes developed by both research and regional staff. These taxa will also need to be protected (by construction of protective breaks or by reduction of fuels in surrounding areas) where possible from potential uncontrolled fires unless such fires fit the conditions determined for the particular fire regime developed for that taxon. Those taxa which are obligate seeders should not be burnt on a frequency less than that required for the plants to produce adequate post-fire seed for successful recruitment events and sustainable regeneration of the population. Species which are lignotuberous and resprout after fire may be reduced in their capacity for regeneration after frequent fires.

Taxa considered to be at greatest risk from frequent fire or requiring protection/exclusion from fire until specific fire regimes are developed are:

<i>Acacia</i> sp. Dandaragan	<i>Eucalyptus dolorosa</i>
<i>Chamelaucium griffinii</i> ms	<i>Grevillea pythara</i>
<i>Darwinia acerosa</i>	<i>Restio chaunocoleus</i>
<i>Darwinia carnea</i>	<i>Spirogardnera rubescens</i>
<i>Drakonorchis drakeoides</i>	<i>Verticordia albida</i>

### 3. Priority Flora in the Moora District

The conservation status of the Priority Flora (poorly known but thought to be rare) in the Moora District is assessed in Part Three. Recommended status, based on recent surveys, is listed in Table 3. For Priority taxa the most urgent requirement is further survey to enable an accurate assessment of their conservation status. Usually Priority One and Priority Two taxa are in most need of survey because of the low numbers of populations and small population sizes.

### 4. Implementation and Term of the Management Program

A recovery team 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 10 years, unless subsequent research or changes to the Schedule of Declared Rare Flora cause it to be superseded earlier. During this period, CALM may institute any changes to the provisions outlined in this Program as are found, through further research, to be necessary for conservation of the Declared Rare Flora in the District.

TABLE 1. Moora District Declared Rare Flora scored (1-3) according to the degree of threat or urgency for management and research action

	Total	Fungal disease	Survey populations	Small/ few populations	Transport corridors	Disturbance opportunists	Land acquisition	Fencing	Mining	Recreation	Habitat degradation	Germ plasm collection	Re-establishment	Liaison	Monitoring	Research	Linear markings	Environmental weeds	Inappropriate fire regime
<i>Acacia forrestiana</i>	10	0	1	0	1	0	0	0	0	0	0	2	0	1	1	0	1	1	2
<i>Acacia vassalii</i>	24	0	2	2	3	1	0	0	0	0	0	2	1	3	3	1	2	2	2
<i>Acacia</i> sp. Dandaragan S. van Leeuwen 269	23	0	3	3	2	0	2	0	0	0	0	2	0	3	2	3	0	0	3
<i>Anigosanthos humilis</i>	11	1	1	0	2	2	0	0	0	0	0	0	0	2	2	1	0	1	1
subsp. <i>chrysanthus</i>																			
<i>Anigosanthos viridis</i>	20	2	2	0	1	3	0	0	2	0	0	2	0	2	2	1	2	0	1
subsp. <i>terraspectans</i>																			
<i>Asterolasia drummondii</i>	16	3	1	0	1	1	0	0	0	1	0	2	0	1	1	2	1	0	2
<i>Banksia tricuspis</i>	11	3	0	0	0	0	0	2	0	0	0	0	0	1	1	2	0	0	2
<i>Cactactasia arnoldii</i> ms	9	0	1	1	1	1	0	0	0	0	0	2	0	0	1	1	1	0	1
<i>Chamelaucium griffinii</i> ms	25	2	3	3	0	0	2	1	0	2	0	3	0	1	3	2	0	0	3
<i>Conostylis micrantha</i>	22	1	1	1	3	1	0	0	1	0	0	2	1	3	3	1	1	2	1
<i>Darwinia acerosa</i>	19	2	1	0	1	0	2	0	0	0	0	2	1	3	2	1	0	1	3
<i>Darwinia carnea</i>	21	1	1	2	0	0	2	3	0	0	0	1	1	3	2	2	0	0	3
<i>Daviesia bursarioides</i> ms	23	2	2	0	2	1	2	0	1	0	0	1	1	3	3	2	0	1	2
<i>Daviesia speciosa</i> ms	22	3	2	0	2	1	0	0	2	0	0	1	0	2	2	3	2	0	2
<i>Drakaea elastica</i>	12	0	1	1	0	0	0	0	0	0	0	2	0	3	1	2	0	0	2
<i>Drakonorchis drakeoides</i>	19	0	1	0	0	0	0	1	0	0	3	2	0	2	3	2	0	2	3
<i>Dryandra mimica</i>	22	3	2	2	0	0	1	2	0	0	0	2	1	3	2	2	0	0	2
<i>Dryandra serratuloides</i>	17	3	2	1	1	0	0	0	1	0	2	1	0	1	1	1	1	0	2
subsp. <i>perissa</i> ms																			
<i>Dryandra serratuloides</i>	20	3	2	1	2	0	1	0	0	0	2	1	0	2	2	1	0	1	2
subsp. <i>serratuloides</i>																			
<i>Eremophila microtheca</i>	20	2	2	1	1	1	0	2	0	0	0	1	0	2	2	2	0	2	2

<i>Eremophila nivea</i>	24	0	1	1	2	1	1	0	0	1	0	1	1	3	3	2	1	3	2	2
<i>Eucalyptus absita</i>	18	0	2	2	1	0	0	0	2	0	0	2	1	2	2	2	1	1	1	1
<i>Eucalyptus argutifolia</i>	8	0	1	1	0	0	0	0	0	0	0	2	0	0	1	2	0	0	1	1
<i>Eucalyptus balanites</i>	16	1	3	3	1	0	0	0	2	0	0	2	0	1	2	0	0	0	2	2
<i>Eucalyptus crispata</i>	12	0	2	1	1	0	0	0	0	0	0	2	0	2	1	1	1	0	1	1
<i>Eucalyptus dolorosa</i>	19	0	3	3	0	0	0	0	2	0	0	2	0	3	1	2	0	0	3	3
<i>Eucalyptus impensa</i>	10	0	1	1	0	0	0	0	0	0	0	2	0	1	1	2	0	0	2	2
<i>Eucalyptus johnsoniana</i>	11	0	2	0	1	0	0	0	0	0	0	2	0	1	1	0	2	0	1	1
<i>Eucalyptus lateritica</i>	9	0	1	1	0	0	0	0	0	0	0	2	0	1	1	2	0	0	1	1
<i>Eucalyptus leprophloia</i>	12	0	2	2	0	0	0	0	0	0	0	2	0	2	1	0	0	0	2	2
<i>Eucalyptus pruiniramis</i>	15	0	1	1	1	0	0	0	2	1	0	2	0	2	2	0	1	1	1	1
<i>Eucalyptus rhodantha</i> var. <i>rhodantha</i>	13	0	0	0	1	0	0	1	0	0	0	1	0	3	2	1	0	1	1	2
<i>Eucalyptus rhodantha</i> var. <i>petiolaris</i>	16	0	1	2	1	0	0	0	1	0	0	2	0	3	2	1	1	1	1	2
<i>Eucalyptus suberea</i>	8	0	2	1	0	0	0	0	0	0	0	2	0	1	1	0	0	0	1	1
<i>Gastrolobium appressum</i>	22	0	2	0	2	1	1	0	1	2	0	2	0	2	2	1	2	2	2	2
<i>Gastrolobium hamulosum</i>	24	1	2	1	1	1	0	0	2	0	0	2	1	3	3	1	2	2	2	2
<i>Grevillea batrachioides</i>	16	2	3	3	0	0	0	0	0	0	0	3	0	0	1	1	0	0	2	2
<i>Grevillea calliantha</i>	26	2	2	1	2	1	2	0	2	0	1	2	1	3	2	1	0	2	2	2
<i>Grevillea christineae</i>	22	0	2	1	2	0	0	0	0	0	0	2	1	3	3	1	2	3	2	2
<i>Grevillea pythara</i>	35	0	3	3	3	0	0	0	3	3	0	3	3	3	3	2	0	3	3	3
<i>Hakea megalosperma</i>	14	2	1	0	1	0	0	0	1	0	0	2	0	2	1	2	1	0	1	1
<i>Hemiantra gardneri</i>	30	0	2	2	3	2	0	0	2	0	0	2	2	3	3	2	2	2	2	2
<i>Hemiantra</i> sp. Watheroo (S. Hancock 4)	27	0	3	3	1	3	0	0	0	0	0	3	0	2	3	3	3	1	2	2
<i>Hensmania chapmanii</i>	18	0	2	2	2	0	1	0	0	0	0	2	1	3	2	1	0	0	2	2
<i>Leucopogon obtectus</i>	15	2	1	1	0	1	0	0	2	0	0	2	0	2	1	1	0	0	2	2
<i>Paracaleana dixonii</i> ms	16	0	1	1	0	3	1	0	0	1	0	2	0	2	2	1	0	0	2	2
<i>Psychosema pusillum</i>	20	1	3	3	1	0	1	0	1	0	1	3	0	3	1	0	0	0	2	2
<i>Restio chaunocoleus</i>	14	1	2	1	2	0	0	0	0	0	0	2	0	2	1	0	0	0	3	3
<i>Spirogardnera rubescens</i>	20	1	1	2	2	0	0	0	0	1	0	2	0	2	2	2	2	0	3	3
<i>Stawellia dimorphantha</i>	26	2	3	3	2	2	0	0	2	0	0	3	0	3	1	1	0	1	1	1
<i>Stylidium scabridum</i>	11	0	0	1	0	0	0	0	0	0	0	2	0	3	2	1	0	0	2	2
<i>Thelymitra stellata</i>	9	0	1	1	0	0	0	0	0	0	0	2	0	1	1	0	0	0	2	2
<i>Verticordia albida</i>	25	0	3	2	3	0	0	0	3	0	0	1	2	3	3	1	0	1	3	3
<i>Wurmbea tubulosa</i>	12	0	1	0	1	0	0	0	0	0	0	2	0	3	2	1	0	1	1	1
<b>Total</b>		<b>45</b>	<b>91</b>	<b>68</b>	<b>60</b>	<b>27</b>	<b>34</b>	<b>24</b>	<b>19</b>	<b>11</b>	<b>7</b>	<b>99</b>	<b>16</b>	<b>114</b>	<b>99</b>	<b>151</b>	<b>32</b>	<b>36</b>	<b>134</b>	<b>134</b>

**TABLE 2. Moora District Declared Rare Flora ranked in priority order for management and research action. Rank totals are derived from the 19 categories of threats, management and research requirements given in Table 1.**

Taxon	Rank
<i>Grevillea pythara</i>	35
<i>Hemiandra gardneri</i>	30
<i>Hemiandra</i> sp. Watheroo (S.Hancocks 4)	27
<i>Grevillea calliantha</i>	26
<i>Stawellia dimorphantha</i>	26
<i>Verticordia albida</i>	25
<i>Chamelaucium griffinii</i> ms	25
<i>Gastrolobium hamulosum</i>	24
<i>Acacia vassalii</i>	24
<i>Eremophila nivea</i>	24
<i>Daviesia bursarioides</i> ms	23
<i>Acacia</i> sp. Dandaragan (S.van Leeuwen 269)	23
<i>Grevillea christineae</i>	22
<i>Conostylis micrantha</i>	22
<i>Daviesia speciosa</i> ms	22
<i>Gastrolobium appressum</i>	22
<i>Dryandra mimica</i>	22
<i>Darwinia carnea</i>	21
<i>Anigozanthos viridis</i> subsp. <i>terraspectans</i>	20
<i>Dryandra serratuloides</i> subsp. <i>serratuloides</i>	20
<i>Ptychosema pusillum</i>	20
<i>Spirogardnera rubescens</i>	20
<i>Eremophila microtheca</i>	20
<i>Darwinia acerosa</i>	19
<i>Drakonorchis drakeoides</i>	19
<i>Eucalyptus dolorosa</i>	19
<i>Eucalyptus absita</i>	18
<i>Hensmania chapmanii</i>	18
<i>Dryandra serratuloides</i> subsp. <i>perissa</i> ms	17
<i>Asterolasia drummondii</i>	16
<i>Eucalyptus balanites</i>	16
<i>Eucalyptus rhodantha</i> var. <i>petiolaris</i>	16
<i>Paracaleana dixonii</i> ms	16
<i>Grevillea batrachioides</i>	16
<i>Eucalyptus pruiniramis</i>	15
<i>Leucopogon oblectus</i>	15
<i>Hakea megalosperma</i>	14
<i>Restio chaunocoleus</i>	14
<i>Eucalyptus rhodantha</i> var. <i>rhodantha</i>	13
<i>Wurmbea tubulosa</i>	12
<i>Drakaea elastica</i>	12
<i>Eucalyptus crispata</i>	12
<i>Eucalyptus leprophloia</i>	12
<i>Eucalyptus johnsoniana</i>	11
<i>Banksia tricuspis</i>	11
<i>Anigozanthos humilis</i> subsp. <i>chrysanthus</i>	11
<i>Stylidium scabridum</i>	11
<i>Acacia forrestiana</i>	10
<i>Eucalyptus impensa</i>	10
<i>Calectasia arnoldii</i> ms	9
<i>Thelymitra stellata</i>	9
<i>Eucalyptus lateritica</i>	9
<i>Eucalyptus argutifolia</i>	8
<i>Eucalyptus suberea</i>	8

**TABLE 3. Priority One, Two and Three Species Lists with recommended status indicated**

SPECIES	RECOMMENDED STATUS
<b>Priority One Species</b>	
<i>Acacia carens</i>	P2
<i>Acacia chapmanii</i> subsp. <i>australis</i> ms	P2*
<i>Acacia cochlocarpa</i> subsp. <i>cochlocarpa</i> ms	P1*
<i>Acacia congesta</i> subsp. <i>cliftoniana</i> ms	P1*
<i>Acacia flabellifolia</i>	P2
<i>Acacia lanceolata</i> ms	P2
<i>Acacia nodiflora</i>	P3
<i>Acacia vittata</i> ms	-
<i>Andersonia longifolia</i>	P2*
<i>Arnocrinum gracillimum</i>	P2*
<i>Chorizema humile</i>	P1*
<i>Conospermum densiflorum</i> subsp. <i>unicephalum</i>	P1*
<i>Conospermum scaposum</i>	P1*
<i>Conostylis dielsii</i> subsp. <i>teres</i>	P1*
<i>Dampiera tephrea</i>	P1*
<i>Darwinia chapmaniana</i> ms	P2*
<i>Darwinia</i> sp. Carnamah (J.Coleby-Williams 148)	P1*
<i>Daviesia pteroclada</i>	P3
<i>Diuris tinkeri</i> ms	P1*
<i>Drosera marchantii</i> subsp. <i>prophylla</i>	P1*
<i>Dryandra borealis</i> subsp. <i>elatior</i>	P3
<i>Dryandra fraseri</i> var. <i>oxycedra</i>	P3
<i>Dryandra kippistiana</i> var. <i>paenepeccata</i>	P3
<i>Dryandra stricta</i>	P3#
<i>Dryandra trifontinalis</i>	P2
<i>Eucalyptus absita</i> x <i>loxophleba</i>	-
<i>Eucalyptus annuliformis</i>	-
<i>Eucalyptus macrocarpa</i> x <i>pyriformis</i>	P3
<i>Eucalyptus subangusta</i> subsp. <i>virescens</i>	P1*
<i>Eucalyptus</i> sp. Lesueur (E.A.Griffin 2481)	P2
<i>Gastrolobium rotundifolium</i>	-
<i>Gompholobium</i> sp. Gairdner Range (E.A.Griffin 2306)	P3
<i>Goodenia arthrotricha</i>	P2*
<i>Goodenia xanthotricha</i>	P2*
<i>Grevillea althoferorum</i>	P1*
<i>Grevillea curviloba</i>	P1*
<i>Grevillea delta</i>	P2*
<i>Grevillea humifusa</i>	P1*
<i>Grevillea murex</i>	P1*
<i>Grevillea pinifolia</i>	P1*
<i>Grevillea tenuiloba</i>	P3
<i>Grevillea thyrsoides</i> subsp. <i>pustulata</i>	P1*
<i>Haloragis foliosa</i>	P3
<i>Halosarcia koobabbiensis</i> ms	-

\* With highest priority for further survey and consideration for gazettal as DRF

# Survey for another population and if found delete from list

- species status to remain unchanged

Delete: species recommended to be removed from the Priority Flora List

<i>Homalocalyx chapmanii</i>	-
<i>Hydrocotyle coorowensis</i> ms	P2
<i>Hypocalymma tenuatum</i> ms	P2
<i>Jacksonia pungens</i> ms	P1*
<i>Jacksonia</i> sp. Badgingarra (H.Demarz D6601) [sp. 14]	-
<i>Lasiopetalum ogilvieanum</i>	P1*
<i>Lasiopetalum</i> sp. Hill River (T.N.Stoate s.n.)	P2
<i>Lechenaultia juncea</i>	P3
<i>Leucopogon plumuliflorus</i>	P3
<i>Macarthuria</i> sp. Mullering (B.J.Banyard 517)	P1*
<i>Malleostemon</i> sp. Cooljarloo (B.Backhouse s.n. 16.11.88)	-
<i>Myriocephalus suffruticosus</i>	P1*
<i>Phlebocarya pilosissima</i> subsp. <i>teretifolia</i>	P2*
<i>Pityrodia viscida</i>	P3
<i>Ptilotus caespitosus</i>	P1*
<i>Restio stenandra</i> ms	P2
<i>Rumex drummondii</i>	P4
<i>Scaevola eneabba</i>	P1*
<i>Schoenus andrewsii</i>	P3
<i>Stylidium drummondianum</i>	P1*
<i>Stylidium pseudocaespitosum</i>	P1*
<i>Synaphea quartzitica</i>	P1*
<i>Tetratheca remota</i>	P1*
<i>Thomasia formosa</i>	P1*
<i>Thomasia tenuivesta</i>	-
<i>Thomasia</i> sp. New Norcia (Cayser)	P1*
<i>Thomasia</i> sp. Green Hill (S.Paust 1322)	P1*
<i>Thysanotus vernalis</i>	P3
<i>Verticordia argentea</i>	P2
<i>Verticordia bifimbriata</i>	P3
<i>Verticordia comosa</i>	P1*
<i>Verticordia dasystylis</i> subsp. <i>oestopoa</i>	P1*
<i>Verticordia fragrans</i>	P3
<i>Verticordia luteola</i> var. <i>rosea</i>	-
<i>Verticordia spicata</i> subsp. <i>squamosa</i>	P1*

### Priority Two Species

<i>Acacia anarthros</i>	P3
<i>Acacia aristulata</i> ms	-
<i>Acacia browniana</i> var. <i>glaucescens</i>	-
<i>Acacia chapmanii</i> subsp. <i>chapmanii</i> ms	P2*
<i>Acacia dura</i>	P1*
<i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i> Cockleshell Gully variant (E.A.Griffin 2039)	-
<i>Acacia plicata</i>	P3
<i>Acacia recurvata</i> ms	P2*
<i>Acacia retrorsa</i>	-
<i>Acacia telmica</i>	P3
<i>Acacia wilsonii</i> ms	P2*
<i>Andersonia gracilis</i>	-
<i>Anigozanthos humilis</i> subsp. <i>grandis</i> ms	-
<i>Arnocrinum drummondii</i>	P3
<i>Astroloma</i> sp. Eneabba (N.Marchant s.n.)	Delete

\* With highest priority for further survey and consideration for gazettal as DRF

# Survey for another population and if found delete from list

- species status to remain unchanged

Delete: species recommended to be removed from the Priority Flora List



<i>Boronia ericifolia</i>	-
<i>Calandrinia dielsii</i>	-
<i>Calytrix chrysantha</i>	P3
<i>Calytrix drummondii</i>	P3
<i>Calytrix eneabbensis</i>	P3
<i>Calytrix platycheiridia</i>	P3
<i>Calytrix superba</i>	P3
<i>Caustis gigas</i> ms	P3
<i>Comesperma rhadinocarpum</i>	-
<i>Crassula helmsii</i>	-
<i>Daviesia debilior</i> subsp. <i>debilior</i>	-
<i>Daviesia dielsii</i>	P3*
<i>Dryandra platycarpa</i>	P4
<i>Epitriche demissus</i>	-
<i>Eucalyptus abdita</i>	-
<i>Eucalyptus angularis</i>	-
<i>Eucalyptus diminuta</i> ms	P3
<i>Gompholobium</i> sp. Marchagee (B.R.Maslin 1427)	-
<i>Goodenia trichophylla</i>	-
<i>Grevillea biformis</i> subsp. <i>cymbiformis</i>	P1
<i>Grevillea bracteosa</i>	-
<i>Grevillea makinsonii</i>	P3
<i>Grevillea synapheae</i> subsp. <i>pachyphylla</i> Minyolo variant (S.Patrick & A.P.Brown SP 1139)	P1*
<i>Grevillea synapheae</i> subsp. <i>synapheae</i> Mt Misery variant (S.D.Hopper 6333)	P1*
<i>Hakea longiflora</i>	P3
<i>Hemigenia curvifolia</i>	-
<i>Hensmania stoniella</i>	P3
<i>Hypocalymma serratum</i> ms	P3
<i>Hypocalymma tetrapterum</i>	P3
<i>Hypocalymma xanthopetalum</i> var. <i>linearifolium</i> ms	-
<i>Hypocalymma</i> sp. Cataby (G.J.Keighery 5151)	P1
<i>Lasiopetalum</i> sp. Coorow (E.Ried 101)	Delete
<i>Leucopogon glaucifolius</i>	P3
<i>Lysinema elegans</i>	P3
<i>Macarthuria apetala</i>	P3
<i>Mesomelaena stygia</i> subsp. <i>deflexa</i>	P1
<i>Monotoca leucantha</i>	P3
<i>Nemcia axillaris</i>	P3
<i>Patersonia spirifolia</i>	P2*
<i>Persoonia chapmaniana</i>	P3
<i>Persoonia filiformis</i>	-
<i>Podotheca unisetata</i>	P3
<i>Schoenus</i> sp. Warradarge (E.A.Griffin 3842)	P3
<i>Schoenus</i> sp. Wongan (E.A.Griffin 3841)	-
<i>Stenanthemum grandiflorum</i> ms	P2*
<i>Stenanthemum limitatum</i>	-
<i>Stylidium aeonioides</i>	-
<i>Stylidium diuroides</i> subsp. <i>paucifoliatum</i>	P3
<i>Stylidium nonscandens</i>	P3
	-

\* With highest priority for further survey and consideration for gazettal as DRF

# Survey for another population and if found delete from list

- species status to remain unchanged

Delete: species recommended to be removed from the Priority Flora List

<i>Thysanotus</i> sp. Badgingarra (E.A.Griffin 2511)	-
<i>Tricoryne robusta</i> ms	-
<i>Triglochin stowardii</i>	-
<i>Trymalium urceolare</i>	-
<i>Verticordia blepharophylla</i>	-
<b>Priority Three Species</b>	
<i>Acacia aprica</i> ms	P2*
<i>Acacia cummingiana</i>	-
<i>Acacia epacantha</i>	-
<i>Acacia inophloia</i>	P2
<i>Acacia isoneura</i> subsp. <i>isoneura</i> ms	-
<i>Acacia isoneura</i> subsp. <i>nimia</i> ms	-
<i>Acacia ridleyana</i>	-
<i>Allocasuarina grevilleoides</i>	-
<i>Allocasuarina ramosissima</i>	-
<i>Banksia micrantha</i>	-
<i>Banksia scabrella</i>	-
<i>Beaufortia bicolor</i>	-
<i>Beaufortia eriocephala</i>	-
<i>Calothamnus brevifolius</i>	-
<i>Catoclea enodis</i> ms	P2
<i>Chamelaucium conostigmum</i> ms	-
<i>Comesperma acerosum</i>	-
<i>Conospermum eatoniae</i>	-
<i>Conostephium minus</i>	P3
<i>Cryptandra nudiflora</i>	-
<i>Daviesia epiphyllum</i>	-
<i>Desmocladus elongatus</i> ms	-
<i>Desmocladus gigas</i> ms	P2
<i>Dryandra echinata</i>	-
<i>Dryandra pteridifolia</i> subsp. <i>vernalis</i>	P2
<i>Dryandra speciosa</i>	-
<i>Dryandra tortifolia</i>	-
<i>Eucalyptus foecunda</i> subsp. nov. Coolimba (M.I.H.Brooker 9556)	-
<i>Grevillea asparagoides</i>	P1
<i>Grevillea leptopoda</i>	-
<i>Grevillea spinosissima</i>	-
<i>Grevillea thyrsoides</i> subsp. <i>thyrsoides</i>	-
<i>Grevillea uncinulata</i> subsp. <i>florida</i>	P1*
<i>Grevillea uniformis</i>	-
<i>Guichenotia alba</i>	-
<i>Haemodorum loratum</i>	-
<i>Hakea myrtoides</i>	-
<i>Hakea spathulata</i>	Delete
<i>Hemigenia pimelifolia</i>	P1
<i>Isopogon drummondii</i>	-
<i>Isopogon tridens</i>	-
<i>Jacksonia anthoclada</i> ms	-
<i>Jacksonia carduacea</i>	-
<i>Kunzea incognita</i> ms	-

\* With highest priority for further survey and consideration for gazettal as DRF

# Survey for another population and if found delete from list

- species status to remain unchanged

Delete: species recommended to be removed from the Priority Flora List

<i>Lasiopetalum lineare</i>	-
<i>Lepidobolus densus</i> ms	-
<i>Lepidobolus quadratus</i> ms	-
<i>Leucopogon oliganthus</i>	-
<i>Melaleuca sclerophylla</i>	-
<i>Myriocephalus appendiculatus</i>	-
<i>Nemcia acuta</i>	-
<i>Olax scalariformis</i>	-
<i>Paterosonia argyria</i>	-
<i>Persoonia pungens</i>	-
<i>Persoonia rudis</i>	-
<i>Petrophile biternata</i>	-
<i>Petrophile plumosa</i>	-
<i>Phlebocarya pilosissima</i> subsp. <i>pilosissima</i>	-
<i>Rinzia crassifolia</i>	-
<i>Scaevola globosa</i>	-
<i>Schoenus benthamii</i>	-
<i>Stenanthemum reissekii</i>	-
<i>Thysanotus anceps</i>	-
<i>Verticordia amphigia</i>	-
<i>Verticordia densiflora</i> var. <i>roseostella</i>	-
<i>Verticordia huegelii</i> var. <i>decumbens</i>	-
<i>Verticordia insignis</i> subsp. <i>eomagis</i>	-
<i>Verticordia luteola</i> var. <i>luteola</i>	-
<i>Verticordia muelleriana</i> subsp. <i>muelleriana</i>	-
<i>Verticordia rutilastra</i>	-
<i>Walteranthus erectus</i>	P2

\* With highest priority for further survey and consideration for gazettal as DRF

# Survey for another population and if found delete from list

- species status to remain unchanged

Delete: species recommended to be removed from the Priority Flora List

**TABLE 4. Changes In Conservation Status**

Work on this Program extended over several years, from 1991 to 1994. Results of survey were forwarded to CALM's Nature Conservation Division at regular intervals, so that changes were made to the status of some taxa during course of the work, either wholly or partly as a result of fieldwork carried out during the Program. These changes are listed below.

SPECIES	ORIGINAL STATUS 1991	1994 STATUS
<i>Acacia chapmanii</i> subsp. <i>australis</i>	P1	P2
<i>Astroloma</i> sp. <i>Cataby</i>	P2	P4
<i>Caladenia cristata</i>	DRF	P4
<i>Conostephium minus</i>	P1	P4
<i>Cryptandra wicheri</i>	P1	Delete
<i>Daviesia chapmanii</i>	P2	P4
<i>Diuris recurva</i>	DRF	P4
<i>Drakaea elastica</i>	DRF	Extension of range into Moora District
<i>Dryandra echinata</i>	P1	P3
<i>Dryandra platycarpa</i>	P2	Delete
<i>Dryandra sclerophylla</i>	P1	P2
<i>Epitriche demissus</i>	P1	P2
<i>Gastrolobium callistachys</i>	DRF	P4
<i>Grevillea christineae</i>	P1	DRF
<i>Grevillea makinsonii</i>	P1	P2
<i>Grevillea saccata</i>	DRF	P4
<i>Grevillea pythara</i>	P1	DRF
<i>Grevillea uncinulata</i> subsp. <i>florida</i>	P1	P3
<i>Grevillea uniformis</i>	P2	P3
<i>Guichenotia alba</i>	P2	P3
<i>Hakea spathulata</i>	P1	P3
<i>Hakea longiflora</i>	P1	P2
<i>Hemigenia curvifolia</i>	P1	P2
<i>Hypocalymma</i> sp. <i>Cataby</i>	P1	P2
<i>Isopogon drummondii</i>	P1	P3
<i>Kunzea incognita</i> ms	P1	P3
<i>Lasiopetalum</i> sp. <i>Coorow</i>	P1	P2
<i>Lasiopetalum</i> sp. <i>Hill River</i>	P1	P2
<i>Lepidobolus densus</i> ms	P1	P3
<i>Loxocarya semiplana</i> ms	P2	Delete
<i>Platysace cirrosa</i>	P2	Delete
<i>Ptychosema pusillum</i>	DRF	Extension of range into Moora District
<i>Scaevola globosa</i>	P1	P3
<i>Patersonia argyrea</i>	P1	P3
<i>Persoonia chapmaniana</i>	P1	P2
<i>Persoonia rudis</i>	P1	P3
<i>Stenanthemum reissekii</i>	P2	P3
<i>Stylidium diuroides</i> subsp. <i>paucifoliatum</i>	P1	P2
<i>Verticordia albida</i>	P1	DRF
<i>Verticordia bifimbriata</i>	P1	P2
<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>	P1	P4
<i>Verticordia luteola</i>	P1	P3
<i>Verticordia paludosa</i>	P1	P4
<i>Verticordia spicata</i> subsp. <i>squamosa</i>	P1	DRF
<i>Wurmbea drummondii</i>	DRF	P4
<i>Xanthosia tomentosa</i>	P1	P4

**TABLE 5. Declared Rare and Poorly Known Flora in the Moora District as at 1994  
Conservation status updated to December 1999**

<b>DECLARED RARE FLORA</b>		
	<b>Conservation Code</b>	
<b>A. Extant Taxa</b>		
<i>Acacia forrestiana</i> .....	R	<i>Paracaleana dixonii</i> ms..... R
<i>Acacia vassalii</i> .....	R	<i>Ptychosema pusillum</i> .....
<i>Acacia</i> sp. Dandaragan (S. van Leeuwen 269).....	R	<i>Restio chaunocoleus</i> (now <i>Chordifex</i> <i>chaunocoleus</i> ).....
<i>Anigozanthos humilis</i> subsp. <i>chrysanthus</i> .....	R	<i>Spirogardnera rubescens</i> .....
<i>Anigozanthus viridis</i> subsp. <i>terraspectans</i> .....	R	<i>Stawellia dimorphantha</i> .....
<i>Asterolasia drummondii</i> .....	P4	<i>Stylidium scabridum</i> .....
<i>Banksia tricuspis</i> .....	P4	<i>Thelymitra stellata</i> .....
<i>Calectasia arnoldii</i> ms.....	R	<i>Verticordia albida</i> .....
<i>Chamelaucium griffinii</i> ms.....	R	<i>Wurmbea tubulosa</i> .....
<i>Conostylis micrantha</i> .....	R	<b>B. Presumed Extinct Taxa</b>
<i>Darwinia acerosa</i> .....	R	<i>Calothammus accedens</i> .....
<i>Darwinia carnea</i> .....	R	<i>Lasiopetalum rotundifolium</i> .....
<i>Daviesia bursarioides</i> .....	R	<i>Leucopogon marginatus</i> .....
<i>Daviesia speciosa</i> .....	R	<i>Menkea draboides</i> .....
<i>Drakaea elastica</i> .....	R	<i>Platysace dissecta</i> (now synonymised with <i>P. juncea</i> ).....
<i>Drakonorchis drakeoides</i> ms.....	R	Deleted
<i>Dryandra mimica</i> .....	R	<b>PRIORITY FLORA</b>
<i>Dryandra serratuloides</i> subsp. <i>perissa</i> .....	R	<b>A. Priority One Taxa</b>
<i>Dryandra serratuloides</i> subsp. <i>serratuloides</i> ....	R	<i>Acacia carens</i> .....
<i>Eremophila microtheca</i> .....	R	<i>Acacia chapmanii</i> subsp. <i>australis</i> ms .....
<i>Eremophila nivea</i> .....	R	<i>Acacia cochlocarpa</i> subsp. <i>cochlocarpa</i> ms.....
<i>Eucalyptus absita</i> .....	R	<i>Acacia congesta</i> subsp. <i>cliftoniana</i> ms .....
<i>Eucalyptus argutifolia</i> .....	R	<i>Acacia flabellifolia</i> .....
<i>Eucalyptus balanites</i> .....	R	<i>Acacia lanceolata</i> ms.....
<i>Eucalyptus crispata</i> .....	R	<i>Acacia nodiflora</i> .....
<i>Eucalyptus dolorosa</i> .....	R	<i>Acacia vittata</i> ms .....
<i>Eucalyptus impensa</i> .....	R	<i>Andersonia longifolia</i> .....
<i>Eucalyptus johnsoniana</i> .....	R	<i>Arnocrinum gracillimum</i> .....
<i>Eucalyptus lateritica</i> .....	R	<i>Chorizema humile</i> .....
<i>Eucalyptus leprophloia</i> .....	R	<i>Conospermum densiflorum</i> subsp. <i>unicephalatum</i> .....
<i>Eucalyptus pruiniramis</i> .....	R	<i>Conospermum scaposum</i> .....
<i>Eucalyptus rhodantha</i> var. <i>petiolaris</i> .....	R	<i>Conostylis dielsii</i> subsp. <i>teres</i> .....
<i>Eucalyptus rhodantha</i> var. <i>rhodantha</i> .....	R	<i>Dampiera tephrea</i> .....
<i>Eucalyptus suberea</i> .....	R	<i>Darwinia chapmaniana</i> ms.....
<i>Gastrolobium appressum</i> .....	R	<i>Darwinia</i> sp. Carnamah (J.Coleby- Williams 148).....
<i>Gastrolobium hamulosum</i> .....	R	<i>Daviesia pteroclada</i> .....
<i>Grevillea batrachoides</i> .....	R	<i>Diuris tinkeri</i> ms (now <i>Diuris</i> sp. Arrowsmith (K.Dixon 924).....
<i>Grevillea calliantha</i> .....	R	<i>Drosera marchantii</i> subsp. <i>prophylla</i> .....
<i>Grevillea christineae</i> .....	R	<i>Dryandra borealis</i> subsp. <i>elatior</i> .....
<i>Grevillea pythara</i> .....	R	<i>Dryandra fraseri</i> var. <i>oxycedra</i> .....
<i>Hakea megalosperma</i> .....	R	<i>Dryandra kippistiana</i> var. <i>paenepeccata</i> .....
<i>Hemiantra gardneri</i> .....	R	<i>Dryandra stricta</i> .....
<i>Hemiantra</i> sp. Watheroo (S.Hancocks 4) (now <i>H. hancocksiana</i> ms) .....	R	<i>Dryandra trifontinalis</i> .....
<i>Hensmania chapmanii</i> .....	R	<i>Eucalyptus absita</i> x <i>loxophleba</i> .....
<i>Leucopogon obtectus</i> .....	R	

<i>Eucalyptus annuliformis</i> .....	P1	<i>Verticordia bifimbriata</i> .....	P4
<i>Eucalyptus macrocarpa</i> x <i>pyriformis</i> .....	P3	<i>Verticordia comosa</i> .....	P1
<i>Eucalyptus subangusta</i> subsp. <i>virescens</i> .....	P1	<i>Verticordia dasystylis</i> subsp. <i>oestopoia</i> .....	P1
<i>Eucalyptus</i> sp. Lesueur (E.A.Griffin 2481) (now <i>Corymbia chlorolampra</i> ) .....	P1	<i>Verticordia fragrans</i> .....	P3
<i>Gastrolobium rotundifolium</i> .....	P1	<i>Verticordia luteola</i> var. <i>rosea</i> .....	P1
<i>Gompholobium</i> sp. Gairdner Range (E.A.Griffin 2306) .....	P3	<i>Verticordia spicata</i> subsp. <i>squamosa</i> .....	R
<i>Goodenia arthrotricha</i> .....	P2	<b>B. Priority Two Taxa</b>	
<i>Goodenia xanthotricha</i> .....	P2	<i>Acacia anarthros</i> .....	P3
<i>Grevillea althoferorum</i> .....	R	<i>Acacia aristulata</i> ms .....	R
<i>Grevillea curviloba</i> .....	R	<i>Acacia browniana</i> var. <i>glaucescens</i> .....	P2
<i>Grevillea delta</i> .....	P2	<i>Acacia chapmanii</i> subsp. <i>chapmanii</i> ms .....	P2
<i>Grevillea humifusa</i> .....	R	<i>Acacia dura</i> .....	P2
<i>Grevillea murex</i> .....	R	<i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i> (Cockleshell Gully variant E.A.Griffin 2039) .....	P2
<i>Grevillea pinifolia</i> .....	P1	<i>Acacia plicata</i> .....	P3
<i>Grevillea tenuiloba</i> .....	P3	<i>Acacia recurvata</i> ms .....	R
<i>Grevillea thyrsoides</i> subsp. <i>pustulata</i> .....	P3	<i>Acacia retrorsa</i> .....	P2
<i>Haloragis foliosa</i> .....	P3	<i>Acacia telmica</i> .....	P3
<i>Halosarcia koobabbiensis</i> ms .....	P1	<i>Acacia wilsonii</i> ms .....	P2
<i>Homalocalyx chapmanii</i> .....	P1	<i>Andersonia gracilis</i> .....	R
<i>Hydrocotyle coorowensis</i> ms .....	P2	<i>Anigozanthos humilis</i> subsp. <i>grandis</i> ms .....	P2
<i>Hypocalymma tenuatum</i> ms .....	P2	<i>Arnocrinum drummondii</i> .....	P3
<i>Jacksonia pungens</i> ms .....	R	<i>Astroloma</i> sp. Eneabba (N.Marchant s.n.) (now <i>Astroloma pedicellatum</i> ms) .....	Deleted
<i>Jacksonia</i> sp. Badgingarra (H.Demarz D6601) [sp. 14] .....	P1	<i>Boronia ericifolia</i> .....	P2
<i>Lasiopetalum ogilvieanum</i> .....	P1	<i>Calandrinia dielsii</i> .....	P2
<i>Lasiopetalum</i> sp. Hill River (T.N.Stoate s.n.) (now <i>Lasiopetalum miseryense</i> ms) .....	P1	<i>Calytrix chrysantha</i> .....	P3
<i>Lechenaultia juncea</i> .....	P3	<i>Calytrix drummondii</i> .....	P3
<i>Leucopogon plumuliflorus</i> .....	P2	<i>Calytrix eneabensis</i> .....	P3
<i>Macarthuria</i> sp. Mullering (B.J.Keighery 517) (now <i>Macarthuria keigheryi</i> ) .....	R	<i>Calytrix platycheiridia</i> .....	P2
<i>Malleostemon</i> sp. Cooljarloo (B.Backhouse s.n. 16.11.88) .....	P1	<i>Calytrix superba</i> .....	P3
<i>Myriocephalus suffruticosus</i> .....	P1	<i>Caustis gigas</i> ms .....	P2
<i>Phlebocarya pilosissima</i> subsp. <i>teretifolia</i> .....	P2	<i>Comesperma rhadinocarpum</i> .....	P2
<i>Pityrodia viscida</i> .....	P3	<i>Crassula helmsii</i> .....	P1
<i>Ptilotus caespitosus</i> .....	P2	<i>Daviesia debilior</i> subsp. <i>debilior</i> .....	P2
<i>Restio stenandra</i> ms (now <i>Chordifex stenandrus</i> ) .....	P2	<i>Daviesia dielsii</i> .....	R
<i>Rumex drummondii</i> .....	P4	<i>Dryandra platycarpa</i> .....	P4
<i>Scaevola eneabba</i> .....	P1	<i>Epitriche demissus</i> .....	P2
<i>Schoenus andrewsii</i> .....	Deleted	<i>Eucalyptus abdita</i> .....	P2
<i>Stylidium drummondianum</i> .....	P3	<i>Eucalyptus angularis</i> .....	P2
<i>Stylidium pseudocaespitosum</i> .....	P1	<i>Eucalyptus diminuta</i> ms .....	P3
<i>Synaphea quartzitica</i> .....	R	<i>Gompholobium</i> sp. Marchagee (B.R.Maslin 1427) .....	P2
<i>Tetratheca remota</i> .....	P1	<i>Goodenia trichophylla</i> .....	P2
<i>Thomasia formosa</i> .....	P1	<i>Grevillea biformis</i> subsp. <i>cymbiformis</i> .....	P2
<i>Thomasia tenuivestita</i> .....	P3	<i>Grevillea bracteosa</i> .....	P2
<i>Thomasia</i> sp. New Norcia (Cayser s.n. Nov. 1918) .....	P1	<i>Grevillea makinsonii</i> .....	P3
<i>Thomasia</i> sp. Green Hill (S.Paust 1322) .....	R	<i>Grevillea synapheae</i> subsp. <i>pachyphylla</i> Minyolo variant (S.Patrick & A.P.Brown SP 1139) .....	P1
<i>Thysanotus vernalis</i> .....	P3	<i>Grevillea synapheae</i> subsp. <i>synapheae</i> Mt Misery variant (S.D.Hopper 6333) .....	P1
<i>Verticordia argentea</i> .....	P2	<i>Hakea longiflora</i> .....	P3

<i>Hemigenia curvifolia</i> .....	P2	<i>Comesperma acerosum</i> .....	P3
<i>Hensmania stoniella</i> .....	P3	<i>Conospermum eatoniae</i> .....	P3
<i>Hypocalymma serratulum</i> ms .....	P3	<i>Conostephium minus</i> .....	P4
<i>Hypocalymma tetrapterum</i> .....	P3	<i>Cryptandra nudiflora</i> .....	P3
<i>Hypocalymma xanthopetalum</i>		<i>Daviesia epiphyllum</i> .....	P3
var. <i>linearifolium</i> ms .....	P2	<i>Desmocladius elongatus</i> ms .....	P3
<i>Hypocalymma</i> sp. <i>Cataby</i>		<i>Desmocladius gigas</i> ms	
(G.J.Keighery 5151) .....	P1	(now <i>Loxocarya gigas</i> ) .....	P2
<i>Lasiopetalum</i> sp. <i>Coorow</i> (E.Ried 101)		<i>Dryandra echinata</i> .....	P3
(now <i>Lasiopetalum oldfieldii</i> subsp.		<i>Dryandra pteridifolia</i> subsp. <i>vernalis</i> .....	P2
<i>biloculatum</i> ) .....	Deleted	<i>Dryandra speciosa</i> subsp. <i>macrocarpa</i> .....	P3
<i>Leucopogon glaucifolius</i> .....	P3	<i>Dryandra tortifolia</i> .....	P3
<i>Lysinema elegans</i> .....	Deleted	<i>Eucalyptus foecunda</i> subsp. <i>Coolimba</i>	
<i>Macarthuria apetala</i> .....	Deleted	(M.I.H.Brooker 9556) .....	P3
<i>Mesomelaena stygia</i> subsp. <i>deflexa</i> .....	P1	<i>Grevillea asparagoides</i> .....	P3
<i>Monotoca leucantha</i> .....	P3	<i>Grevillea leptopoda</i> .....	P3
<i>Nemcia axillaris</i> .....	P3	<i>Grevillea spinosissima</i> .....	P3
<i>Patersonia spirafolia</i> .....	R	<i>Grevillea thyrsoides</i> subsp. <i>thyrsoides</i> .....	P3
<i>Persoonia chapmaniana</i> .....	P3	<i>Grevillea uncinulata</i> subsp. <i>florida</i> .....	P3
<i>Persoonia filiformis</i> .....	P2	<i>Grevillea uniformis</i> .....	P3
<i>Podotheca uniseta</i> .....	P3	<i>Guichenotia alba</i> .....	P3
<i>Schoenus</i> sp. <i>Warradarge</i>		<i>Haemodorum loratum</i> .....	P3
(E.A.Griffin 3842) (now <i>S. insolitus</i> ) ....	Deleted	<i>Hakea myrtoides</i> .....	Deleted
<i>Schoenus</i> sp. <i>Wongan</i> (E.A.Griffin 3841)		<i>Hakea spathulata</i> .....	P3
(now <i>Schoenus griffinianus</i> ) .....	P2	<i>Hemigenia pimelifolia</i> .....	P1
<i>Stenanthemum grandiflorum</i> ms .....	P2	<i>Isopogon drummondii</i> .....	P3
<i>Stenanthemum limitatum</i> .....	P2	<i>Isopogon tridens</i> .....	P3
<i>Stylidium aeonioides</i> .....	P2	<i>Jacksonia anthoclada</i> ms .....	P3
<i>Stylidium diuroides</i> subsp. <i>paucifoliatum</i> .....	P3	<i>Jacksonia carduacea</i> .....	P3
<i>Stylidium nonscandens</i> .....	P3	<i>Kunzea incognita</i> ms .....	Deleted
<i>Thysanotus</i> sp. <i>Badgingarra</i>		<i>Lasiopetalum lineare</i> .....	P3
(E.A.Griffin 2511) .....	P2	<i>Lepidobolus densus</i> ms .....	P3
<i>Tricoryne robusta</i> ms .....	P2	<i>Lepidobolus quadratus</i> ms .....	P3
<i>Triglochin stowardii</i> .....	P2	<i>Leucopogon oliganthus</i> .....	P3
<i>Trymalium urceolare</i> .....	P2	<i>Melaleuca sclerophylla</i> .....	P3
<i>Verticordia blepharophylla</i> .....	P2	<i>Myriocephalus appendiculatus</i> .....	P3
		<i>Nemcia acuta</i> .....	P3
		<i>Olax scalariformis</i> .....	P3
		<i>Patersonia argyrea</i> .....	P3
		<i>Persoonia pungens</i> .....	P3
		<i>Persoonia rudis</i> .....	P3
		<i>Petrophile biternata</i> .....	P3
		<i>Petrophile plumosa</i> .....	P3
		<i>Phlebocarya pilosissima</i>	
		subsp. <i>pilosissima</i> .....	P3
		<i>Rinzia crassifolia</i> .....	P4
		<i>Scaevola globosa</i> .....	P3
		<i>Schoenus benthamii</i> .....	P3
		<i>Stenanthemum reissekii</i> .....	P3
		<i>Thysanotus anceps</i> .....	P3
		<i>Verticordia amphigia</i> .....	P3
		<i>Verticordia densiflora</i> var. <i>roseostella</i> .....	P3
		<i>Verticordia huegelii</i> var. <i>decumbens</i> .....	P3
		<i>Verticordia insignis</i> subsp. <i>eomagis</i> .....	P3
<b>C. Priority Three Taxa</b>			
<i>Acacia aprica</i> ms .....	R		
<i>Acacia cummingiana</i> .....	P3		
<i>Acacia epacantha</i> .....	P3		
<i>Acacia inophloia</i> .....	P3		
<i>Acacia isoneura</i> subsp. <i>isoneura</i> ms .....	P3		
<i>Acacia isoneura</i> subsp. <i>nimia</i> ms .....	P3		
<i>Acacia ridleyana</i> .....	P3		
<i>Allocauarina grevilleoides</i> .....	P3		
<i>Allocauarina ramosissima</i> .....	P3		
<i>Banksia micrantha</i> .....	P3		
<i>Banksia scabrella</i> .....	P4		
<i>Beaufortia bicolor</i> .....	P3		
<i>Beaufortia eriocephala</i> .....	P3		
<i>Calothamnus brevifolius</i> .....	P3		
<i>Catocolea enodis</i> ms .....	P2		
<i>Chamelaucium conostigmum</i> ms .....	P3		

<i>Verticordia luteola</i> var. <i>luteola</i> .....	P3
<i>Verticordia muelleriana</i>	
subsp. <i>muelleriana</i> .....	P3
<i>Verticordia rutilastra</i> .....	P3
<i>Walteranthus erectus</i> .....	P2

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.

deleted species has been taken off the Priority Flora list



**TABLE 6. Taxa in the Moora District added to the CALM Priority Flora List Updated to December 1999**

<i>Acacia acanthoclada</i> subsp. <i>glaucescens</i> ms	3	Jul-Sep
<i>Acacia alata</i> var <i>platyptera</i>	1	Jun-Aug
<i>Acacia filifolia</i>	3	May-Nov
<i>Acacia latipes</i> subsp. <i>licina</i> ms	3	Jun-Jul
<i>Acacia lineolata</i> subsp. <i>multilineata</i>	1	Jun-Aug
<i>Acacia lirellata</i> subsp. <i>lirellata</i> ms	3	Jun-Sep
<i>Acacia hulfitziorum</i> ms	3	Aug-Oct
<i>Acacia trinalis</i> ms	1	Sep
<i>Baeckea</i> sp. Billeranga Hills (ME Trudgen 2206)	1	Sep
<i>Baeckea</i> sp. Bungil (BR Maslin 5067)	1	Nov-Dec
<i>Baeckea</i> sp. Moora (R. Bone 1993/1)	1	Dec
<i>Baeckea</i> sp. Three Springs (ME Trudgen 5368)	2	Sep,Oct
<i>Baeckea tenuifolia</i>	3	Jan-Mar
<i>Beyeria similis</i>	3	Aug-Sep
<i>Boronia ramosa</i> subsp. <i>lesueurana</i>	2	Jul-Aug
<i>Boronia scabra</i> subsp. <i>condensata</i>	2	Aug
<i>Comesperma griffinii</i> ms	2	-
<i>Desmocladius biformis</i>	3	Aug
<i>Desmocladius semiplanus</i> ms	1	-
<i>Dryandra catoglypta</i>	2	Jun-Jul
<i>Dryandra cypholoba</i>	2	Aug
<i>Dryandra fuscobracteata</i>	1	Jul-Oct
<i>Dryandra lindleyana</i> subsp. <i>pollostata</i>	3	Aug
<i>Dryandra nobilis</i> subsp. <i>fragrans</i>	3	Jul-Sep
<i>Dryandra subulata</i>	3	Aug-Sep
<i>Eleocharis keigheryi</i>	R	-
<i>Geleznowia verrucosa</i>	3	Jun-Sep
<i>Grevillea erinacea</i>	3	Aug-Dec
<i>Guichenotia impudica</i> ms	3	-
<i>Guichenotia quasicarpa</i> ms	2	Oct
<i>Guichenotia tuberculata</i> ms	3	Aug, Sep
<i>Hopkinsia anoetocolea</i>	3	-
<i>Hydrocotyle vigintimilia</i> ms	1	Sep
<i>Hypolaena robusta</i>	2	Sep-Oct
<i>Lasiopetalum molle</i> subsp. <i>boothendarrense</i> ms	2	Sep
<i>Levenhookia octomaculata</i>	3	Nov
<i>Microcorys longifolia</i>	3	Aug-Oct
<i>Micromyrtus rogeri</i> ms	1	Jul
<i>Micromyrtus</i> sp. Arrowsmith River (LA Craven 6873 & C Chapman)	1	Oct
<i>Micromyrtus</i> sp. Three Springs (Cranfield 7885)	1	Sep, Oct
<i>Onychosepalum microcarpum</i>	1	Aug-Oct
<i>Persoonia sulcata</i>	3	Sep-Nov
<i>Sarcocornia globosa</i>	3	-
<i>Scaevola paludosa</i>	2	Sep-Oct
<i>Schoenus indutus</i>	1	
<i>Scholtzia</i> sp. Eradu (RD Royce 8016)	2	Oct, Nov
<i>Scholtzia</i> sp. Prowaka Springs (RJ Cranfield & P. Spencer 8083)	1	Sep
<i>Stenanthemum tridentatum</i>	3	Jul-Oct
<i>Stylidium cymiferum</i>	1	Oct

<i>Stylidium torticarpum</i>	2	Oct
<i>Synaphea aephynsa</i>	3	Jul-Oct
<i>Synaphea endothrix</i>	2	Aug-Sep
<i>Synaphea grandis</i>	3	Oct-Nov
<i>Synaphea lesueurensis</i>	2	Aug-Oct
<i>Synaphea oulopha</i>	1	Jun-Aug
<i>Synaphea rangiferops</i>	2	Aug-Sep
<i>Synaphea sparsiflora</i>	1	Aug-Sep
<i>Thryptomene</i> sp. Eneabba (RJ Cranfield 8433)	2	Nov
<i>Thryptomene</i> sp. Lancelin (ME Trudgen 14000)	2	Sep
<i>Thryptomene</i> sp. Mingenew (Diels & Pritzel 332)	1	Jul

## REFERENCES

- Aplin, T.E.H. (1969). Poison plants of Western Australia. *Journal of Agriculture of Western Australia* 10, 248-257.
- Aplin, T.E.H. (1973). *Poison plants of Western Australia. The toxic species of the genera Gastrolobium and Oxylobium*. Bulletin 3772. Western Australian Department of Agriculture, South Perth, W.A.
- Aston, H.I. (1973). *Aquatic plants of Australia*. Melbourne University Press, Melbourne.
- Barker, R.M. (1990). New species, new combinations and other name changes in *Hakea* (Proteaceae). *Journal of the Adelaide Botanic Gardens* 13, 95-110.
- Baxter, J.L. and Lipple, S.L. (1985). *Perenjori, Western Australia*. 1:250 000 Geological Series - Explanatory Notes. Geological Survey of Western Australia, Perth.
- Beard, J.S. (1976a). *The vegetation of the Dongara area, W.A.* Vegmap Publications, Perth.
- Beard, J.S. (1976b). *The vegetation of the Perenjori area, W.A.* Vegmap Publications, Perth.
- Beard, J.S. (1979a). *The vegetation of the Moora and Hill River areas, W.A.* Vegmap Publications, Perth.
- Beard, J.S. (1979b). *The vegetation of the Perth area, W.A.* Vegmap Publications, Perth.
- Beard, J.S. (1980). A new phytogeographic map of Western Australia. *Research Notes* 3, 37-58.
- Bell, D.T. and Loneragan, W.A. (1985). The relationship of fire and soil type to floristic patterns within heathland vegetation near Badgingarra, Western Australia. *Journal of the Royal Society of Western Australia* 67, 98-109.
- Benl, G. (1971). A key for the determination of the genus *Ptilotus* R. Br. (Amarantaceae). *Mitteilungen der Botanischen Staatssammlung Munchen* 9, 135-176.
- Bennett, E.M. (1982). A guide to the Western Australian she-oaks (*Allocasuarina* and *Casuarina* species). *Western Australian Naturalist* 15(4), 77-105.
- Bennett, E.M. (1991). *Common and aboriginal names of Western Australian plant species*. Wildflower Society of Western Australia, Eastern Hills Branch, Boya, W.A.
- Bennett, E.M. (1995). *Conospermum*. In: Orchard, A.E. (ed.), *Flora of Australia*, Vol. 16. CSIRO Australia, Melbourne, pp 224-271.
- Bentham, G. (1855). *Plantae Mullerianae. Mimoseae*. *Linnaea* 26, 621.
- Bentham, G. (1863-1878). *Flora Australiensis*, Vols. 1-7. Lovell Reeve & Co., London.
- Blackall, W.E. and Grieve, B.J. (1974, 1980, 1981, 1985, 1988). *How to know Western Australian wildflowers*. Parts I, II, IIIA, IIIB, I (2nd edition). University of Western Australia Press, Perth.
- Blakely, W.F., McKie, E.N. and Steedman, H.S. (1938). Descriptions of four new species and two varieties of eucalypts. *Proceedings of the Linnean Society of New South Wales* 63, 65-69.
- Briggs, J.D. and Leigh, J.H. (1988). *Rare or threatened Australian plants*. Special publication No. 14. Australian National Parks and Wildlife Service, Canberra.
- Briggs, J.D. and Leigh, J.H. (1996). *Rare or threatened Australian plants*. 1995 revised edition. CSIRO Publishing Victoria.

- Brittan, N.H. (1960). New Western Australian species of *Thysanotus* R. Br. *Journal of the Royal Society of Western Australia* 43, 10-11.
- Brittan, N.H. (1981). Revision of the genus *Thysanotus* R. Br. (Liliaceae). *Brunonia* 4(1), 67-181.
- Brittan, N.H. (1987). *Thysanotus*. In: George, A.S. (ed.), *Flora of Australia*, Vol. 45. Australian Government Publishing Service, Canberra, pp 308-338.
- Brooker, M.I.H. and Blaxell, D.F. (1978). Five new species of *Eucalyptus* from Western Australia. *Nuytsia* 2(4), 220-231.
- Brooker, M.I.H. and Hopper, S.D. (1986). Notes on the informal subgenus "Monocalyptus" of *Eucalyptus* (Myrtaceae) and the description of three new upland species from south-west Western Australia. *Nuytsia* 5(3), 341-356.
- Brooker, M.I.H. and Kleinig, D.A. (1990). *Field guide to eucalypts*, Vol. 2. *South Western and Southern Australia*. Inkata Press, Melbourne.
- Brooker, M.I.H. and Hopper, S.D. (1991). A taxonomic revision of *Eucalyptus wandoo*, *E. redunca* and allied species (*Eucalyptus* series *Levispermae* Maiden - Myrtaceae) in Western Australia. *Nuytsia* 8(1), 1-189.
- Brooker, M.I.H. and Hopper, S.D. (1993). New series, subseries, species and subspecies of *Eucalyptus* (Myrtaceae) from Western Australia and from South Australia. *Nuytsia* 9(1), 1-68.
- Brown, A., Thomson-Dans, C. and Marchant, N. (eds) (1998). *Western Australia's Threatened Flora*. Department of Conservation and Land Management. Como, W.A.
- Brown, N.E. (1914). *Plantarum Novarum in Horti Regii Conservatorium*. *Bulletin of Miscellaneous Information* [Royal Botanic Gardens, Kew], 189.
- Burbidge, A.A., Hopper, S.D. and van Leeuwen, S. (eds) (1990). *Nature conservation, landscape and recreation values of the Lesueur area*. A report to the Environmental Protection Authority from the Department of Conservation and Land Management. Bulletin 424. Environmental Protection Authority, Perth.
- Burbidge, A.A. and van Leeuwen, S. (eds) (1990). *The Hill River project and the proposed conservation reserve at Lesueur*. A report to the Environmental Protection Authority from the Department of Conservation and Land Management. Occasional Paper 1/9. Department of Conservation and Land Management, Como, W.A.
- Burbidge, A.H. and Boscacci, L.J. (1989). *A spring reconnaissance survey of the flora and fauna of the Southern Beekeepers Reserve*. Technical Report No. 22. Department of Conservation and Land Management, W.A.
- Burgman, M.A. (1983). Rare and geographically restricted plants of Western Australia. *Gastrolobium appressum* C.A. Gardner, *Hemiandra gardneri* O.H. Sargent, *Regelia megacephala* C.A. Gardner, *Jacksonia eremodendron* E. Pritzel, *Adenanthos stictus* George. Unpublished Report 20. Department of Fisheries and Wildlife, Perth.
- Carlquist, S. (1969). Studies in Stylidiaceae: New taxa, field observations, evolutionary tendencies. *Aliso* 7, 43-44.
- Carlquist, S. (1976). New species of *Stylidium*, and notes on Stylidiaceae from South Western Australia. *Aliso* 8(4), 447-463.
- Candolle, A. de (1839). *Prodromus systematis naturalis regni vegetabilis*, Vol. 7. Treuttel et Murtz, Paris, p. 767.
- Carolin, R.C. (1974). *Nigromnia*, a new genus of Goodeniaceae. *Nuytsia* 1(4), 292-293.

- Carolin, R.C. (1990a). Nomenclatural notes and new taxa in the genus *Goodenia* (Goodeniaceae). *Telopea* 3(4), 517-570.
- Carolin, R.C. (1990b). Nomenclatural notes, new taxa and the systematic arrangement in the genus *Scaevola* (Goodeniaceae) including synonyms. *Telopea* 3(4), 477.
- Carolin, R.C. (1992). Goodeniaceae. In: George, A.S. (ed.), *Flora of Australia*, Vol. 35. Australian Government Publishing Service, Canberra, pp 4-300.
- Carter, J.D. and Lipple, S.L. (1982). *Moora, Western Australia*. 1:250 000 Geological Series - Explanatory Notes. Geological Survey of Western Australia, Perth.
- Chapman, A.R. and Maslin, B.R. (1992). *Acacia* miscellany 5. A review of the *A. bivenosa* group (Leguminosae: Mimosoideae: Section Phyllodineae). *Nuytsia* 8(2), 249-283.
- Chinnock, R.J. (1985). Five endangered new species of Myoporaceae from south-western Australia. *Nuytsia* 5(3), 391-400.
- Cooke, D.A. (1984). *Patersonia argyrea*, a new species of Iridaceae from the Gairdner Range, Western Australia. *Nuytsia* 5(1), 155-158.
- Cooke, D.A. (1986). Iridaceae. In: George, A.S. (ed.), *Flora of Australia*, Vol. 46. Australian Government Publishing Service, Canberra, pp 13-26.
- Craven, L.A. (1987a). A revision of *Homalocalyx* F. Muell. (Myrtaceae). *Brunonia* 10(2), 139.
- Craven, L.A. (1987b). A taxonomic revision of *Calytrix* Labill. (Myrtaceae). *Brunonia* 10(1), 1-138.
- Crisp, M.D. (1982). *Daviesia spiralis* and *Daviesia debilior* (Leguminosae: Papilionoideae), two new species occurring in the Wongan Hills, Western Australia. *Nuytsia* 4(1), 9-16.
- Crisp, M.D. (1985). *Conservation of the genus Daviesia*. Australian National Botanic Gardens. Occasional Publication No. 6. Australian Government Publishing Service, Canberra.
- Crisp, M.D. and Weston, P.H. (1987). Appendix 1. Cladistics and legume systematics, with an analysis of the Bossiaceae, Brongniartieae and Mirbelieae. In: Stirton, C.H. (ed.), *Advances in legume systematics*, Part 3. Royal Botanic Gardens, Kew.
- Crisp, M.D. and Mollemans, F.H. (1993). *Nemcia effusa* (Fabaceae: Mirbelieae), a new species from south-west Western Australia, and a key to *Nemcia*. *Nuytsia* 9(2), 223-232.
- Crisp, M.D. (1995). Contributions towards a revision of *Daviesia* (Fabaceae: Mirbelieae). III. A synopsis of the genus. *Australian Systematic Botany* 8, 1155-1249.
- Crook, I.G., Williams, A.A.E., Chatfield, G.R. and Moore, S.A. (1984). *Nature reserves of the Shire of Dandaragan*, Vol. 1. Western Australian Nature Reserve Management Plan No. 5. Department of Fisheries and Wildlife, Perth.
- Diels, L. and Pritzel, E. (1904-5). Fragmenta Phytographiae Australiae Occidentalis. *Botanische Jahrbucher fur Systematik, Pflanzengeschichte und Pflanzengeographie* 35.
- Diels, L. (1906). *Die Pflanzenwelt von West-Australien sudlich des Wendekreises*. Wilhelm Engelmann, Leipzig.
- Dixon, I.R. (1991). Tinsel Lilies. *Calectasia* of Western Australia. *Australian Plants* 16(131) 307.
- Dixon, R. (1990). *Calytrix* in WA. Propagation and cultivation. *Australian Plants* 15(123), 324-329.
- Dixon, R. and Keighery, G. (1992). WA Lilies. *Australian Plants*. 17(133), 7-19.

- Domin, K. (1923). *Nemcia*, a new genus of the Leguminosae. *Preslia* 2, 26-31.
- Elkington, J.E. (1987). Report on the vegetation at Cooljarloo W.A. Unpublished report for TIO2 Corporation. Ekomin Pty. Ltd., South Perth.
- Elkington, J.E. and Griffin, E.A. (1984). Botanical survey of thirteen mineral claims on Reserves C27886 and C31030. Unpublished report by Ekomin Pty. Ltd. for Allied Eneabba.
- Elliot, R. and Jones, D. (1980-1990) *Encyclopaedia of Australian plants suitable for cultivation*. Lothian, Melbourne.
- Elliot, R. and Jones, D. (1990). *Calytrix* for horticulture. *Australian Plants* 15(123), 306-320.
- Erickson, R. (1969). *The Drummonds of Hawthornden*. Lamb Patterson Ltd., Perth.
- Erickson, R, George, A.S., Marchant, N.G. and Morcombe, M.K. (1979). *Flowers and plants of Western Australia*. Reed, Sydney.
- Erickson, R. (1981). *Triggerplants*. University of Western Australia Press, Nedlands, W.A.
- Everist, S.L. (1981). *Poisonous plants of Australia*. Angus and Robertson, Sydney.
- Fitzgerald, W.V. (1903). Descriptions of some new species of West Australian plants. *Proceedings of the Linnaean Society of New South Wales* 28, 104-105.
- Fitzgerald, W.V. (1904). Additions to the West Australian flora. *Journal of the West Australian Natural History Society* 2(1), 3-36.
- Fitzgerald, W.V. (1905). Some new species of West Australian plants. *Journal of the West Australian Natural History Society* 2(2), 23.
- Fitzgerald, W.V. (1912). New West Australian plants. *Journal of Botany, British and Foreign* 50, 23.
- Foreman, D.B. (1990). New species of *Petrophile* R. Br. (Proteaceae) from Western Australia. *Muelleria* 7(2), 301-310.
- Foulds, W. and McMillan, R.P. (1985). An ecological study of heathlands of the Leeman area, Western Australia. Unpublished report to the Australian Heritage Commission.
- Froend, R.H. (1988). Investigations into species richness patterns in the Northern Sandplain Region of Western Australia. Unpublished Ph.D. thesis, Botany Department, University of Western Australia.
- Gardner, C.A. (1928). Contributiones Florae Australiae Occidentalis. 7. *Journal of the Royal Society of Western Australia* 14, 79-85.
- Gardner, C.A. (1931). *Enumeratio Plantarum Australiae Occidentalis: A systematic census of the plants occurring in Western Australia*. Government Printer, Perth.
- Gardner, C.A. (1934). Contributiones Florae Australiae Occidentalis 8. *Journal of the Royal Society of Western Australia* 19, 81.
- Gardner, C.A. (1943). Contributiones Florae Australiae Occidentalis 11. *Journal of the Royal Society of Western Australia* 27, 183.
- Gardner, C.A. and Bennetts, H.W. (1956). *The toxic plants of Western Australia*. Western Australian Newspapers Ltd., Perth.

- Gardner, C.A. and George, A.S. (1963). Eight new plants from Western Australia. *Journal of the Royal Society of Western Australia* 46, 134.
- Gardner, C.A. (1964). Contributiones Florae Australiae Occidentalis 13. *Journal of the Royal Society of Western Australia* 47, 54-64.
- George, A.S., Hopkins, A.J.M. and Marchant, N.G. (1979). The heathlands of Western Australia. In: Specht, R.L. (ed.), *Ecosystems of the world. 9A. Heathlands and related shrublands. Descriptive studies*. Elsevier, Amsterdam, pp 211-230.
- George, A.S. (1981). The genus *Banksia* L.f. (Proteaceae). *Nuytsia* 3(3), 239-473.
- George, A.S. (1984a). Olacaceae. In: George, A.S. (ed.), *Flora of Australia*, Vol. 22. Australian Government Publishing Service, Canberra, pp 16-25.
- George, A.S. (1984b). *The Banksia book*. Kangaroo Press in association with The Society for Growing Australian Plants - N.S.W. Ltd.
- George, A.S. (1984c). *Dryandra mimica*, a new species of Proteaceae from south-west Western Australia. *Nuytsia* 5(1), 49-51.
- George, A.S. (1991). New taxa, combinations and typifications in *Verticordia* (Myrtaceae: Chamelaucieae). *Nuytsia* 7(3), 231-394.
- George, A.S. (1995). *Synaphea*. In: George, A.S. (ed.), *Flora of Australia*, Vol. 16. Australian Government Publishing Service, Canberra, pp 271-315.
- George, A.S. (1996). New taxa and a new infrageneric classification in *Dryandra* R. Br. (Proteaceae: Grevilleoideae). *Nuytsia* 10(3), 313-408.
- George, E.A. and George, A.S. (1994). New taxa of *Verticordia* (Myrtaceae : Chamelaucieae) from Western Australia. *Nuytsia* 9(3), 333-341.
- Grayling, P.M. (1989). An investigation of taxonomy, reproductive biology and hybridity in four taxa of *Eucalyptus* of extreme rarity. Honours thesis, Department of Biology, University of Western Australia.
- Grayling, P.M. and Brooker, M.I.H. (1992). Four new species of *Eucalyptus* (Myrtaceae) from Western Australia. *Nuytsia* 8(2), 209-218.
- Grieve, B.J. and Blackall, W.E. (1982). *How to know Western Australian wildflowers*, Part IV. University of Western Australia Press, Nedlands, W.A.
- Griffin, E.A., Hnatiuk, R.J. and Hopper, S.D. (1982). Flora conservation values of vacant crown land south of Mount Adams, Western Australia. *Western Australian Herbarium Research Notes* 7, 31-47.
- Griffin, E.A., Hopkins, A.J.M. and Hnatiuk, R.J. (1983). Regional variations in mediterranean type shrublands near Eneabba, south-western Australia. *Vegetatio* 52, 103-127.
- Griffin, E.A. (1985). Studies in the genus *Dryandra* R. Br. (Proteaceae) 1. Species distribution, ecology and conservation status. *Western Australian Herbarium Research Notes* 11, 1-40.
- Griffin, E.A. and Hopkins, A.J.M. (1985). The flora and vegetation of Mt. Lesueur, Western Australia. *Journal of the Royal Society of Western Australia* 67, 45-58.
- Griffin, E.A. and Keighery, B.J. (1989). *Moore River to Jurien sandplain survey*. Western Australian Wildflower Society, Perth.
- Griffin, E.A. (1990). *Floristic survey of remnant vegetation in the Dandaragan area*. Western Australia. Resource Management Technical Report No. 143. Department of Agriculture, South Perth, W.A.

- Griffin, E.A., Hopper, S.D. and Hopkins, A.J.M. (1990). Flora. In: Burbidge, A.A., Hopper, S.D. and van Leeuwin, S. (eds), *Nature conservation, landscape and recreational values of the Lesueur area*. A report to the Environmental Protection Authority from the Department of Conservation and Land Management. Bulletin 424. Environmental Protection Authority, Perth, pp 39-69.
- Griffin, E.A. (1991). Flora and vegetation of Watheroo Bentonitic Lakes. Unpublished report for Bentonite (Aust.) Pty. Ltd.
- Griffin, E.A. (1992). *Floristic survey of remnant vegetation in the Bindoon to Moora area, Western Australia*. Resource Management Technical Report No. 142. Department of Agriculture, South Perth, W.A.
- Griffin, E.A. (1994). *Floristic survey of northern sandplains between Perth and Geraldton, Western Australia*. Resource Management Technical Report No. 144. Department of Agriculture, South Perth, W.A.
- Harris, J.G. and Harris, M.W. (1994). *Plant identification terminology. An illustrated glossary*. Spring Lake Publishing, Spring Lake, Utah.
- Hawkeswood, T.J. (1984a). Nine new species of *Calothamnus* Labill. (Myrtaceae: Leptospermoideae) from Western Australia. *Nuytsia* 5(1), 123-153.
- Hawkeswood, T.J. (1984b). *Calothamnus accedens* T.J. Hawkeswood (Myrtaceae), a rare and endangered new species from Western Australia. *Nuytsia* 5(2), 305-310.
- Hewson, H.J. (1982). Brassicaceae (Cruciferae) In: George, A.S. (ed.), *Flora of Australia*, Vol. 8. Australian Government Publishing Service, Canberra, pp 231-357.
- Hill, K.D. and Johnson, L.A.S. (1992). Systematic studies in the eucalypts. 5. New taxa and combinations in *Eucalyptus* (Myrtaceae) in Western Australia. *Telopea* 4(4), 563.
- Hoffman, N. and Brown, A. (1984). *Orchids of south-west Australia*. University of Western Australia Press, Nedlands, W.A.
- Hoffman, N. and Brown, A. (1992). *Orchids of south-west Australia*. Second Edition. University of Western Australia Press, Nedlands, W.A.
- Holliday, I. and Watton, G. (1975). *A field guide to Banksias*. Rigby, Adelaide.
- Holliday, I. (1989). *A field guide to Melaleucas*. Hamlyn, Australia.
- Hooker, W.J. (1840). *Icones Plantarum*. Tab CCXCV.
- Hooker, W.J. (1844). *Icones Plantarum*. Tab DCXVII.
- Hooker, W.J. (ed.) (1855). *The journal of botany and Kew Garden miscellany* 7, 121.
- Hopkins, A.J.M. and Hnatiuk, R.J. (1981). An ecological survey of the Kwongan south of Eneabba, Western Australia. *Wildlife Research Bulletin of Western Australia* 9, 1-33.
- Hopper, S.D. (1979). Biogeographical aspects of speciation in the southwest Australian flora. *Annual review of ecology and systematics* 10, 399-422.
- Hopper, S.D. (1987). Haemodoraceae. In: George, A.S. (ed.), *Flora of Australia*, Vol. 45. Australian Government Publishing Service, Canberra, pp 57-110, 112-126.
- Hopper, S.D. (1993). *Kangaroo paws and catspaws*. Department of Conservation and Land Management, Como, W.A.



- Jones, D.L. (1988). *Native orchids of Australia*. Reed, Australia.
- Keighery, G.J. (1985). *Waltheranthus*, a new genus of Gyrostemonaceae from Western Australia. *Botanische Jahrbucher fur Systematik, Pflanzengeschichte und Pflanzengeographie* 106, 107-113.
- Keighery, G.J. (1987). *Arnocrinum*, *Hensmania* and *Stawellia*. In: George, A.S. (ed.), *Flora of Australia*, Vol. 45. Australian Government Publishing Service, Canberra, pp 249-254.
- Keighery, G.J. (1990). *Patersonia spirafolia* (Iridaceae), a new species from south-western Australia. *Nuytsia* 7(2), 137-139.
- Keighery, G.J. (1992). A new species of *Guichenotia* (Sterculiaceae) from south-western Australia. *Nuytsia* 8(3), 319-321.
- Kelly, A.E., Coates, D.J., Herford, I., Hopper, S.D., O'Donahue, M. and Robson, L. (1990). *Declared rare flora and other plants in need of special protection in the Northern Forest Region*. Western Australian Wildlife Management Program No. 5. Department of Conservation and Land Management, Como, W.A.
- Kelly, A.E., Taylor, A., Langley, M.A., Spooner, A. and Coates, D.J. (1993). *Declared rare flora and other plants in need of special protection in the metropolitan area*. Western Australian Wildlife Management Program No. 10. Australian National Parks and Wildlife Service, Canberra and Department of Conservation and Land Management, Como, W.A.
- Kelly, A.E. and Coates, D.J. (1995). *Rose mallee recovery plan*. Western Australian Wildlife Management Program No. 14. Department of Conservation and Land Management, Como, W.A.
- Kelly, A.E., Napier, A. and Hopper, S. (1995). *Survey of rare and poorly known eucalypts of Western Australia*. CALMScience Supplement 2. Department of Conservation and Land Management, Como, W.A., 206 p.
- Lamont, B.B. (1976). A biological survey and recommendations for rehabilitating a portion of Reserve 31030 to be mined for heavy minerals during 1975-81. Unpublished report by Wait-Aid Ltd. for Allied Eneabba Pty. Ltd.
- Lamont, B.B. and van Leeuwen, S.J. (1988). Seed production and mortality in a rare *Banksia* species. *Applied Ecology* 25, 551-559.
- Lee, A.T. (1973). A new genus of Papilionaceae and related Australian genera. *Contributions from the New South Wales National Herbarium* 4(7), 412-430.
- Lehmann, J.G.C. (ed.) (1844-1848). *Plantae Preissianae sive Enumeratio Plantarum, quas in Australasia Occidentali et Meridionali - occidentali annis 1838-41 Collegit Ludwig Preiss*, Vols 1 & 2. Meissner, Hamburg.
- Leigh, J., Briggs, J. and Hartley, W. (1981). *Rare or threatened Australian plants*. Australian National Parks and Wildlife Service, Canberra.
- Leigh, J., Boden R. and Briggs, J. (1984). *Extinct and endangered plants of Australia*. Macmillan Company of Australia Pty. Ltd., Melbourne.
- Lesueur National Park and Coomallo Nature Reserve. Draft Management Plan (1994). Department of Conservation and Land Management for the National Parks and Nature Conservation Authority, Perth.
- Lewis, J. (1981). Rare and geographically restricted plants of Western Australia. *Conostylis tomentosa* S.D. Hopper ms, *Isopogon tridens* (Meisn.) F. Muell., *Leucopogon obiectus* Benth. Unpublished Report 8. Department of Fisheries and Wildlife, Perth.

- Lievense, D. (1981). Rare and geographically restricted plants of Western Australia. *Eucalyptus pendens* M.I.H. Brooker, *E. johnsoniana* M.I.H. Brooker, *Banksia tricuspis* Meisn. Unpublished Report 7. Department of Fisheries and Wildlife, Perth.
- Lindley, J. (1839-1840). A sketch of the vegetation of the Swan River Colony. *Appendix to the first 23 volumes of Edwards Botanical Register*. James Ridgway, London.
- Lowrie, A. (1987). *Carnivorous plants of Australia*, Vol. 1. University of Western Australia Press, Nedlands, W.A.
- Lowrie A. and Carlquist, S. (1991). Studies in *Stylidium* from Western Australia: new taxa; rediscoveries and range extensions. *Phytologia* 71(1), 5-28.
- Lowry, D.C. (1974). *Dongara-Hill River, Western Australia*. 1:250 000 Geological Series - Explanatory Notes. Australian Government Publishing Service, Canberra.
- Lucas, G. and Synge, H. (eds) (1978). *The IUCN plant red data book*. International Union for Conservation of Nature and Natural Resources, Morges, Switzerland.
- Macfarlane, T.D. (1980). A revision of *Wurmbea* (Liliaceae) in Australia. *Brunonia* 3(2), 145-208.
- Macfarlane, T.D. (1987). *Haemodorum, Phlebocarya and Wurmbea*. In: George, A.S. (ed.), *Flora of Australia*, Vol. 45. Australian Government Publishing Service, Canberra.
- Marchant, N.G. and Keighery, G.J. (1979). Poorly collected and presumably rare vascular plants of Western Australia. *Kings Park Research Notes*, No. 5. Kings Park and Botanic Garden, West Perth.
- Marchant, N.G., Wheeler, J.R., Rye, B.L., Bennett, E.M., Lander, N.S. and Macfarlane, T.D. (1987). *Flora of the Perth Region*, Vols 1 & 2. Western Australian Herbarium, Department of Agriculture, South Perth.
- Marchant, N. and Lowrie, A. (1993). New names and new combinations in 35 taxa of Western Australian tuberous and pygmy *Drosera*. *Kew Bulletin* 47, 315-328.
- Maiden, J.H. and Blakely, W.F. (1928). Descriptions of fifty new species and six varieties of Western and northern Australian acacias, and notes on four other species. *Journal of the Royal Society of Western Australia*. 13, 1-36.
- Makinson, R.O. and Olde, P.M. (1991). A new species of *Grevillea* (Proteaceae: Grevilleoideae) from south-west Western Australia. *Telopea* 4(2), 351-354.
- Martinick, W.G. and Associates. (1988). Gairdner Range: Coal project. Vegetation types, Vegetation mapping and rare plants. Unpublished report for CRA Exploration Pty. Ltd. Perth.
- Maslin, B.R. (1975). Studies in the genus *Acacia* (Mimosaceae). 4. A revision of the series Pulchellae. *Nuytsia* 1(5), 388-494.
- Maslin, B.R. (1978). Studies in the genus *Acacia* (Mimosaceae). 7. The taxonomy of some diaphylloclinous species. *Nuytsia* 2(4), 215-216.
- Maslin, B.R. (1979). Studies in the genus *Acacia* (Mimosoideae). 9. Additional notes on the series Pulchellae Benth. *Nuytsia* 2(6), 354-367.
- Maslin, B.R. (1995). *Acacia* miscellany 13. Taxonomy of some Western Australian phyllocladinous and aphyllodinous taxa (Leguminosae: Mimosoideae). *Nuytsia* 10(2), 151-179.
- McCusker, A. (1981). Glossary. In: George, A.S. (ed.), *Flora of Australia*, Vol. 1. Australian Government Publishing Service, Canberra.

- McGillivray, D.J. (1986). *New names in Grevillea (Proteaceae)*. The Author, Castle Hill, New South Wales.
- McGillivray, D.J. and Makinson, R.O. (1993). *Grevillea. Proteaceae. A taxonomic revision*. Melbourne University Press.
- McNee, S. (1986). The pollination biology of *Eucalyptus rhodantha*. M. Appl. Sc. thesis, Curtin University, Perth.
- Meisner, C.F. (1855). Leguminosae quaedam Australasicae novae. *Botanische Zeitung* (Berlin) 13, p. 10, 29.
- Millar, K.A.G. (1982). Rare and geographically restricted plants of Western Australia. Unpublished report 19. Department of Fisheries and Wildlife, Perth.
- Mildbraed, J. (1908). Stylidiaceae. In: Engler, A. (ed.). *Das Pflanzenreich*. IV. 278 (Heft 35). H.R. Engelmann, Weinheim.
- Mollemans, F.H., Brown, P.H. and Coates, D.J. (1993). *Declared rare flora and other plants in need of special protection in the Merredin District (excluding the Wongan-Ballidu Shire)*. Western Australian Wildlife Management Program No. 9. Australian National Parks and Wildlife Service, Canberra, ACT and Department of Conservation and Land Management, Como, W.A.
- Moora District dieback protection plan* (1990). Department of Conservation and Land Management, Como, W.A.
- Morrison, D.A. (1992). *Lechenaultia*. In: George, A.S. (ed.), *Flora of Australia*, Vol. 35. Australian Government Publishing Service, Canberra.
- Mueller, F. v. (1858-1882). *Fragmenta Phytographiae Australiae*. Government Printer, Melbourne.
- Munir, A.A. (1979). A taxonomic revision of the genus *Pityrodia* (Chloanthaceae). *Journal of the Adelaide Botanic Gardens* 2(1), 1-138.
- Napier, A.C., Taylor, A. and Hopper, S.D. (1988a). *Survey of rare and poorly known eucalypts of Western Australia. Field Guide No. 3. Greenough Region*. Department of Conservation and Land Management, Como, W.A.
- Napier, A.C., Taylor, A. and Hopper, S.D. (1988b). *Survey of rare and poorly known eucalypts of Western Australia. Field Guide No 5. Forests and Metropolitan Regions*. Department of Conservation and Land Management, Como, W.A.
- Norman, C. (1939). Notes on the genus *Platysace* Bunge. *Journal of Botany, British and Foreign* 77, 207-211.
- Olde, P.M. (1986). New names in *Grevillea*. *Australian Plants* 13(108), 362-376.
- Olde, P.M. and Marriott, N.R. (1993). New species and taxonomic changes in *Grevillea* (Proteaceae : Grevilleoideae) from south-west Western Australia. *Nuytsia* 9(2), 237-304.
- Olde, P. and Marriott, N. (1994-5). *The Grevillea book*, Vols. 1-3. Kangaroo Press, Kenthurst, New South Wales.
- Orchard, A.E. (1975). Taxonomic revisions in the family Haloragaceae. I. The genera *Haloragis*, *Haloragodendron*, *Glischrocaryon*, *Meziella* and *Gonocarpus*. *Bulletin of the Auckland Institute and Museum* 10, 1-299.
- Orchard, A.E. (1977). Taxonomic revision in the family Haloragaceae II. Further notes on *Haloragis*, *Haloragodendron* and *Gonocarpus*. *Nuytsia* 2(3), 126-144.

- Orchard, A.E. (1990). Haloragaceae. In: George, A.S. (ed.), *Flora of Australia*. Vol. 18. Australian Government Publishing Service, Canberra, pp 5-85.
- Papenfus, D., Brown, A. and Bunny, F. (1996). Foote's *Grevillea* (*Grevillea calliantha*), Interim recovery plan. Department of Conservation and Land Management, Western Australian Threatened Species and Communities Unit, Wanneroo, W.A.
- Patrick, S.J. (1985). Rare and geographically restricted plants of Western Australia. possibly extinct and extremely rare plants of the Wheatbelt of Western Australia. Unpublished report 28. Department of Conservation and Land Management, Como, W.A.
- Patrick, S.J. and Hopper, S.D. (1982). *A guide to the gazetted rare flora of Western Australia*. Supplement 1. Report No. 54. Department of Fisheries and Wildlife, Perth.
- Paust, S. (Downes, S.) (ca. 1973). Key to *Lasiopetalum*. Unpublished manuscript.
- Paust, S. (1974). Taxonomic studies in *Thomasia* and *Lasiopetalum* (Sterculiaceae). *Nuytsia* 1(4), 348-366.
- Perry, D.H. (1971). In the footsteps of James Drummond with Charles Austin Gardner. *Western Australian Naturalist* 11(8), 178-180.
- Poellnitz, Karl von (1934). *Feddes Repertorium Specierum Novarum Regni Vegetabilis* 35, 163.
- Rajput, M.T.M. and Carolin, R.C. (1992). Goodeniaceae. In: A.S. George (ed.), *Flora of Australia*, Vol. 35. Australian Government Publishing Service, Canberra, pp 34-80.
- Rechinger, K.H. (1984). *Rumex* (Polygonaceae) in Australia: a reconsideration. *Nuytsia* 5(1), 75-122.
- Rogers, R.S. (1920). Contributions to Australian orchidology. *Transactions of the Royal Society of South Australia* 44, 322-359.
- Rye, B.L. (1980). Rare and geographically restricted plants of Western Australia. Wongan Hills species. Unpublished report 4. Department of Fisheries and Wildlife, Perth.
- Rye, B.L. and Hopper, S.D. (1981). *A guide to the gazetted rare flora of Western Australia*. Report No. 42. Department of Fisheries and Wildlife, Perth.
- Rye, B.L. (1995). New and priority taxa in the genera *Cryptandra* and *Stenanthemum* (Rhamnaceae) of Western Australia. *Nuytsia* 10(2), 255-305.
- Sainsbury, R.M. (1985). *A field guide to Dryandra*. University of Western Australia Press. Nedlands, W.A.
- Sainsbury, R.M. (1987). *A field guide to isopogons and petrophiles*. University of Western Australia Press, Nedlands, W.A.
- Sainsbury, R.M. (1991). *A field guide to smokebushes and honeysuckles. (Conospermum and Lambertia)*. University of Western Australia Press, Nedlands, W.A.
- Sampson, J.F. (1988). The population genetic structure of *Eucalyptus rhodantha* Blakely & Steedman and its allies *Eucalyptus crucis* Maiden and *Eucalyptus lane-poolei* Maiden. Ph.D. thesis, University of Western Australia.
- Sampson, J.F. and Hopper, S.D. (1989). Survey of endangered poison plants of Western Australia. Field Guide. Informal publication. Western Australian Department of Conservation and Land Management in association with the World Wildlife Fund Australia.

- Sampson, J.F. and Hopper, S.D. (1990). *Endangered poison plants of Western Australia. Final report World Wildlife Fund Project P105*. Western Australian Department of Conservation and Land Management/World Wildlife Fund Australia.
- Sampson, J.F., Hopper, S.D. and Coates, D.J. (1990). *Eucalyptus rhodantha*. Wildlife Management Program No. 4. Department of Conservation and Land Management, Como, W.A.
- Sargent, O.H. (1927). Notes on the genus *Hemiandra* R. Br. *Journal of Botany* 65, 175.
- Scott, J.K. & Yeoh, P.B. (1995). The rediscovery and distribution of *Rumex drummondii* (Polygonaceae) in south-western Australia. *Australian Journal of Botany* 43, 397-405.
- Shaw, E.A. (1970). A revision of the genus *Menkea*. *Contributions from the Gray Herbarium of Harvard University*. No. 200, 175-189.
- Short, P.S. (1983). A revision of *Angianthus* Wendl., sensu lato (Compositae: Inulae: Gnaphaliinae), 1. *Muelleria* 5(2), 143-214.
- Short, P.S. (1989). A revision of *Podotheca* Cass. (Asteraceae: Inuleae: Gnaphaliinae). *Muelleria* 7, 39-56.
- Speck, N.H. (1958). The vegetation of the Darling-Irwin Botanical Districts. Ph.D. thesis (Botany), University of Western Australia.
- Stauffer, H.U. (1968). Santalales studies 4. *Spirogardnera*, a new genus of Santalaceae from Western Australia. *Naturforschende Gesellschaft in Zurich* 113, 307 (translation).
- Strid, A. (1987). New species of *Beaufortia* and *Chamelaucium* (Myrtaceae), *Drosera* (Droseraceae) and *Pultenaea* (Fabaceae) from SW Australia. *Plant Systematics and Evolution* 155, 339-347.
- Taylor, J.M. and Crisp, M.D. (1992). A revision of *Chorizema* (Leguminosae: Mirbeliaceae). *Australian Systematic Botany* 5, 249-335.
- Taylor A. and Hopper, S. (1988). *The Banksia atlas*. Australian Flora and Fauna Series No. 8. Bureau of Flora and Fauna, Canberra and Department of Conservation and Land Management, Western Australia. Australian Government Publishing Service, Canberra.
- Thompson, J. (1976). A revision of the genus *Tetralochea* (Tremandraceae). *Telopea* 1(3), 139-215.
- Thongpukdee, A. (1987). *Tricoryne* In: George, A.S. (ed.), *Flora of Australia*, Vol. 45. Australian Government Publishing Service, Canberra
- Toelken, H.R. (1981). The species of *Crassula* in Australia. *Journal of the Adelaide Botanic Gardens* 3(1), 57-90.
- Trudgen, M.E. (1986). Reinstatement and revision of *Rinzia* Schauer (Myrtaceae, Leptospermeae, Baeckeinae). *Nuytsia* 5(3), 415-439.
- Turczaninow, N. (1862). Generum Plantarum Hucusque Non Descriptorum. *Bulletin de la Societe Imperiale des Naturalistes de Moscou* 35(2), 325.
- van Leeuwen, S. (1985). An investigation of the biology and conservation status of *Banksia tricuspis*, a gazetted rare species. Thesis Grad. Dip. Nat. Resources. W.A. Institute of Technology, Perth.
- Watson, L. (1962). A taxonomic revision of the genus *Andersonia* R. Br. (Epacridaceae). *Kew Bulletin* 16, 85-128.
- Weston, P. (1994). The Western Australian species of subtribe *Persooniinae* (Proteaceae: Persoonioideae: Persoonieae). *Telopea* 6(1), 51-165.

Wilson, K.L. (1981). Revision of the genus *Mesomelaena* (Cyperaceae). *Telopea* 2(2), 181-195.

Wilson, K.L. and Johnson, L.A.S. (1989). Casuarinaceae. In: George, A.S. (ed.), *Flora of Australia*, Vol. 3. Australian Government Publishing Service, Canberra, pp 100-189.

Wilson, P.G. (1971). Taxonomic notes on the family Rutaceae, principally of Western Australia. *Nuytsia* 1, 197-207.

Wilson, P.G. (1987). The names *Asterolasia* F. Muell. and *Urocarpus* Harvey (Rutaceae). *Nuytsia* 6(1), 7-8.

## GLOSSARY

<b>abaxial</b>	the side away from the axis (compare <b>adaxial</b> )
<b>achene</b>	a small, dry indehiscent fruit with a single locule and a single seed (ovule), and with the seed attached to the ovary wall at a single point
<b>acuminate</b>	tapering gradually to a protracted point
<b>acute</b>	terminating in a distinct but not protracted point, the converging edges separated by an angle less than 90 degrees
<b>adaxial</b>	the side toward the axis (compare <b>abaxial</b> )
<b>adnate</b>	fusion of unlike parts, as the stamens to the corolla (compare <b>connate</b> )
<b>alternate</b>	<i>of leaves or other lateral organs</i> , borne singly at different heights on the axis; <i>of floral parts</i> , on a different radius, e.g. describing the position of stamens with respect to petals. cf. <b>opposite</b>
<b>annual</b>	a plant whose life span ends within one year after germination
<b>annular</b>	in the form of a ring
<b>anther</b>	the expanded, apical, pollen bearing portion of the stamen
<b>anthesis</b>	the flowering period, when the flower is fully expanded and functioning
<b>apiculate</b>	terminating in a short, sharp, flexible point
<b>appendage</b>	a structure arising from the surface or extending beyond the tip of another structure
<b>appressed</b>	pressed closely against but not united with
<b>aril</b>	an appendage growing at or near the hilum of the seed; fleshy thickening of the seed coat
<b>article</b>	a segment of a jointed stem or of a fruit with constrictions between the seeds
<b>ascending</b>	growing erect after an oblique or semi-horizontal beginning
<b>attenuate</b>	tapering gradually
<b>auricle</b>	a small ear-shaped appendage
<b>awl-shaped</b>	short, narrowly triangular, and sharply pointed like an awl
<b>awn</b>	a bristle-like appendage, e.g. on the tip or back of the lemma of a grass floret
<b>axil</b>	the angle between a leaf or bract and the axis bearing it. adj. <b>axillary</b>
<b>axis</b>	a stem, (commonly used for the main stem of a whole plant or of an inflorescence)
<b>beak</b>	a prominent terminal projection, especially of a carpel or fruit
<b>bifurcate</b>	two-forked; divided into two branches

<b>bract</b>	a leaf-like structure, different in form from the foliage leaves and without an axillary bud, associated with an inflorescence or flower
<b>bracteole</b>	a small bract-like structure borne singly or in pairs on the pedicel or calyx of a flower
<b>branchlet</b>	a small branch
<b>bulb</b>	an underground bud with thickened fleshy scales, as in the onion
<b>calli</b>	small outgrowths in the throat of the corolla
<b>callosity</b>	a hardened or thickened area
<b>calyx</b>	the sepals of one flower collectively
<b>calyx-tube</b>	a tube formed by fusion or cohesion of sepals. cf. <b>hypanthium</b>
<b>campanulate</b>	bell-shaped
<b>capitate</b>	head-like, or in a head-shaped cluster
<b>capitulum</b>	a racemose inflorescence with sessile flowers compacted on a flattened and expanded, or rounded apex of a peduncle
<b>capsule</b>	a dry fruit formed from two or more united carpels and dehiscing at maturity to release the seeds
<b>carpel</b>	a simple pistil formed from one modified leaf, or that part of a compound pistil formed from one modified leaf
<b>cheiridium</b>	the joined bracts beneath the flower in <i>Calytrix</i> , which form a sleeve-like structure
<b>cilia</b>	<i>in unicellular plants, gametes, spores etc.</i> , minute hair-like protoplasmic protrusions whose movement confers motility on the cell; <i>in higher plants</i> , hairs more or less confined to the margins of an organ. sing. <b>cilium</b> ; adj. <b>ciliate</b>
<b>clavate</b>	club-shaped
<b>claw</b>	a narrow, stalk-like basal portion of a petal, sepal or bract
<b>clone</b>	a group of individuals originating from a single parent plant by vegetative reproduction
<b>column</b>	a structure extending above the ovary and incorporating stigma, style and stamens
<b>compressed</b>	flattened in one plane, either dorsally (bringing the front and back closer together) or laterally (bringing the sides closer together)
<b>cone</b>	(loosely) <i>in Casuarina</i> , a woody multiple fruit incorporating the bracts and bracteoles associated with the flowers
<b>connate</b>	fused to another organ (or other organs) of the same kind
<b>connective</b>	the part of an anther that connects the lobes



<b>conspecific</b>	of the same species
<b>convolute</b>	<i>of the arrangement of corolla lobes in a bud</i> , a form of imbricate aestivation in which each segment has one edge overlapping the adjacent segment, like a furled umbrella
<b>cordate</b>	<i>of a leaf blade</i> , broad and notched at the base; heart-shaped
<b>corm</b>	a fleshy, swollen stem base, usually underground, in which food reserves are stored between growing seasons
<b>corolla</b>	the petals of a flower collectively
<b>corymb</b>	a racemose inflorescence in which the pedicels of the lower flowers are longer than those of the flowers above, bringing all flowers to about the same level
<b>crisped</b>	curled
<b>crown</b>	the part of a tree or shrub above the level of the lowest branch
<b>cuneate</b>	wedge-shaped
<b>cuspidate</b>	tapering into a sharp, rigid point
<b>cyme</b>	an inflorescence in which each flower, in turn, is formed at the tip of a growing axis and further flowers are formed on branches arising below it
<b>decumbent</b>	spreading horizontally but then growing upwards
<b>decurrent</b>	extending downwards beyond the point of insertion, e.g. of a lamina extending downwards to form a flange along the petiole
<b>decussate</b>	in pairs, with successive pairs borne at right angles to each other
<b>dehiscent</b>	breaking open at maturity to release the contents
<b>deltoid</b>	triangular, with the sides of about equal length
<b>dentate</b>	toothed
<b>denticulate</b>	finely toothed
<b>dichotomous</b>	forking into two equal branches resulting from the division of the growing point
<b>disc</b>	a plate or rim of tissue, derived from the receptacle of a flower, occurring between whorls of floral parts
<b>distal</b>	remote from the point of origin or attachment. cf. <b>proximal</b>
<b>divaricate</b>	widely spreading
<b>dorsal</b>	relating to the back or outward surface of an organ in relation to the axis, as in the lower surface of a leaf
<b>dorsiventral</b>	having structurally different upper and lower surfaces
<b>double-conic</b>	relating to the shape of eucalypt buds, when the hypanthium and operculum are of the same size and cone shape

<b>drupe</b>	a succulent fruit formed from one carpel, having the seed(s) enclosed in an inner stony layer of the fruit wall. adj. <b>drupaceous</b> (which is often used to mean drupe-like but not strictly a drupe)
<b>ellipsoid</b>	a solid body elliptic in long section and circular in cross section
<b>elliptic</b>	oval in outline, widest at the centre
<b>endemic</b>	having a natural distribution confined to a particular geographical region
<b>entire</b>	having a smooth margin, not dissected or toothed
<b>ephemeral</b>	short-lived
<b>epidermis</b>	the outermost cellular layer of a non-woody plant or organ
<b>exserted</b>	protruding, e.g. of stamens with respect to a corolla tube
<b>falcate</b>	sickle-shaped
<b>family</b>	a group of one to many genera believed to be related phylogenetically, usually clearly separable from other such groups
<b>filament</b>	the stalk of a stamen; a thread one or more cells thick; <i>in blue-green Algae</i> , a trichome enclosed in a mucilaginous sheath. cf. <b>anther</b>
<b>filiform</b>	thread-like
<b>flexuose</b>	with curves or bends; sinuous; somewhat zigzagged
<b>floral</b>	belonging to or associated with a flower
<b>floret</b>	a grass flower, together with the lemma and palea that enclose it (often applied to flowers in Cyperaceae and Asteraceae)
<b>follicle</b>	a dry, dehiscent fruit formed from one carpel and dehiscing along the line of fusion of its edges
<b>free</b>	not fused or united (with other organs)
<b>fruit</b>	the seed-bearing structure in angiosperms formed from the ovary after flowering
<b>fusiform</b>	spindle-shaped, broadest near the middle and tapering toward both ends
<b>genus</b>	a group of species believed to be related phylogenetically and usually clearly separable from other such groups, or a single species without close relatives. pl. <b>genera</b>
<b>glabrescent</b>	becoming glabrous
<b>glabrous</b>	without hairs
<b>gland</b>	a structure, without or on the surface of a plant, with a secretory function
<b>glandular</b>	bearing glands; functioning as a gland
<b>glaucous</b>	blue-green in colour, with a whitish bloom (as in the juvenile leaves of many eucalypts)

<b>glume</b>	one of the paired bracts at the base of a grass spikelet; a chaffy bract in the grasses or sedges
<b>habit</b>	the growth form of a plant, comprising its size, shape, texture and orientation
<b>habitat</b>	the environment in which a plant lives
<b>halophyte</b>	a plant adapted to living in highly saline habitats; a plant that accumulates high concentrations of salt in its tissues
<b>hastate</b>	arrowhead-shaped but with the basal lobes turned outward rather than downward
<b>herb</b>	any vascular plant that never produces a woody stem. cf. <b>forb</b>
<b>herbaceous</b>	not woody; soft in texture
<b>hilum</b>	a scar on the seed indicating its point of attachment
<b>hyaline</b>	translucent, almost like clear glass
<b>hybrid</b>	an offspring of genetically different parents (in a Flora, usually applied where the parents are of different species)
<b>hypanthium</b>	a cup or tube bearing floral parts above the base, and often above the top, of the ovary of a flower
<b>imbricate</b>	of perianth parts, having the edges overlapping in the bud. Fig. 25
<b>incurved</b>	bent or curved inwards or upwards; <i>of leaf margins</i> , curved towards the adaxial surface
<b>indumentum</b>	the epidermal coverings of a plants, collectively.
<b>indusium</b>	tissue covering the sorus of a fern; the pollen cup of Goodeniaceae.
<b>inferior</b>	<i>of an ovary</i> , at least partly below the level of attachment of the other flora parts. cf. <b>superior</b>
<b>inflexed</b>	bent sharply upwards or forwards
<b>inflorescence</b>	the group or arrangement in which flowers are borne on a plant
<b>internode</b>	the portion of a stem between the level of insertion of two successive leaves or leaf pairs (or branches of an inflorescence)
<b>involucre</b>	a whorl of bracts subtending a flower or flower cluster
<b>juvenile</b>	<i>of leaves</i> , formed on a young plant and different in form from the adult leaves
<b>keel</b>	a ridge like the keel of a boat; in particular, a boat-shaped structure formed by fusion of the two anterior petals of a flower in Fabaceae
<b>keeled</b>	<i>of leaves or bracts</i> , folded and ridged along the midrib
<b>labellum</b>	a lip; <i>in Orchidaceae</i> , the distinctive median petal that serves as an alighting platform for pollinating insects
<b>lamina</b>	the blade of a leaf

<b>lanceolate</b>	<i>of a leaf</i> , about four times as long as it is broad, broadest in the lower half and tapering towards the tip
<b>leaflet</b>	one of the ultimate segments of a compound leaf
<b>legume</b>	a fruit characteristic of the families Mimosaceae, Caesalpiniaceae and Papilionaceae formed from one carpel and either dehiscent along both sides, or indehiscent
<b>lignotuber</b>	a woody swelling below or just above the ground, containing adventitious buds from which new shoots develop if the top of the plant is cut or burnt (common in the shrubby eucalypts and in many other fire-tolerant Australian shrubs)
<b>ligule</b>	a tongue-shaped or strap-shaped organ; the flattened part of the ray corolla in the Asteraceae; the membranous appendage arising from the inner surface of the leaf at the junction with the leaf sheath in many grasses and some sedges
<b>limb</b>	the upper free, spreading portion of a corolla or perianth that is connate at the base
<b>linear</b>	very narrow in relation to the length, and with the sides parallel
<b>lunate</b>	crescent-shaped
<b>mallee</b>	a growth habit in which several woody stems arise separately from a lignotuber (usually applied to shrubby eucalypts); a plant having the above growth habit
<b>marginal</b>	occurring at or very close to the margin
<b>mericarp</b>	a section of a schizocarp; one of the two halves of the fruit in the Apiaceae
<b>midrib</b>	the central, and usually the most prominent, vein of a leaf or leaf-like organ
<b>mucro</b>	a sharp, abrupt terminal point. adj. <b>mucronate</b>
<b>nerve</b>	a vein
<b>node</b>	the level (transverse plane) of a stem at which one or more leaves arise
<b>obconical</b>	cone-shaped but attached at the narrower end
<b>obcordate</b>	<i>of a leaf blade</i> , broad and notched at the tip; heart-shaped but attached at the pointed end
<b>oblanceolate</b>	similar in shape to <b>lanceolate</b> but attached at the narrower end
<b>oblique</b>	<i>of a leaf or leaflet</i> , larger on one side of the midrib than on the other, i.e. asymmetrical. Fig. 23
<b>oblong</b>	having the length greater than the width but no many times greater, and the sides parallel. Fig. 23
<b>obovate</b>	similar in shape to <b>ovate</b> but attached at the narrower end. Fig. 23
<b>obtuse</b>	blunt or rounded at the apex, the converging edges separated by an angle greater than 90 degrees

<b>operculum</b>	a lid or cover becoming detached at maturity by abscission; <i>in Eucalyptus</i> (for example), a cap covering the bud and formed by fusion or cohesion of perianth parts
<b>opposite</b>	<i>of leaves</i> , borne at the same level but on opposite sides of the stem; <i>of floral parts</i> , on the same radius. cf. <b>alternate</b>
<b>orbicular</b>	circular or nearly so
<b>ovate</b>	shaped like a section through the long axis of an egg, and attached by the wider end. Fig. 23
<b>ovoid</b>	egg-shaped (in three dimensions)
<b>ovule</b>	an immature seed
<b>panicle</b>	a compound raceme; an indeterminate inflorescence in which the flowers are borne on branches of the main axis or on further branches of these
<b>paniculate</b>	indeterminate and much branched
<b>papilla</b>	a small, elongated protuberance on the surface of an organ, usually an extension of one epidermal cell. adj. <b>papillose</b>
<b>pappus</b>	a tuft (or ring) of hairs or scales borne above the ovary and outside the corolla in Asteraceae and possibly representing the calyx; a tuft of hairs on a fruit
<b>pedicel</b>	the stalk of a flower. adj. <b>pedicellate</b>
<b>peduncle</b>	the stalk of an inflorescence; <i>in ferns</i> , the stalk of a sporocarp. adj. <b>pedunculate</b>
<b>peltate</b>	<i>of a leaf</i> , having the stalk attached to the lower surface of the blade, not the margin (also applied in the same sense to other stalked structures)
<b>penicillate</b>	pencil-shaped; tufted like an artist's brush
<b>perennial</b>	a plant whose life span extends over more than two growing seasons
<b>perianth</b>	the calyx and corolla of a flower, especially where the two are similar
<b>petal</b>	a member of the inner whorl of non-fertile parts surrounding the fertile organs of a flower, usually soft and coloured conspicuously
<b>petiole</b>	the stalk portion of a leaf
<b>phyllode</b>	a leaf whose blade is much reduced or absent, and whose petiole and rachis have assumed the functions of the whole leaf. cf. <b>cladode</b>
<b>phyloclade</b>	a very leaf-like, photosynthetic stem of a plant whose true leaves are much reduced. cf. <b>cladophyll</b>
<b>pinna</b>	one of the primary divisions or leaflets of a pinnate leaf
<b>pinnule</b>	a leaflet of a bipinnate leaf
<b>pilose</b>	hairy, the hairs soft and clearly separated but not sparse
<b>pinnate</b>	divided into pinnae; once-compound. cf. <b>bipinnate</b>

<b>pinnatifid</b>	cut deeply into lobes that are spaced out along the axis (of the leaf). cf. <b>palmatifid</b>
<b>pinnatisect</b>	dissected down to the midrib but having the segments confluent with it
<b>pistil</b>	a free carpel or a group of fused carpels
<b>placenta</b>	a region, within an ovary, to which ovules are attached
<b>plumose</b>	like a feather; with fine hairs branching from a central axis
<b>pod</b>	a leguminous fruit
<b>pollen presenter</b>	the modified style end in <i>Banksia</i>
<b>pollination</b>	the transfer of pollen from the male organ, where it is formed, to the receptive region of a female organ, e.g. from anther to stigma
<b>procumbent</b>	trailing or spreading along the ground but not rooting at the nodes
<b>prostrate</b>	lying flat on the ground
<b>pruinose</b>	having a whitish, waxy, powdery bloom on the surface
<b>puberulous</b>	covered with minute, soft, erect hairs
<b>pubescent</b>	covered with short, soft, erect hairs
<b>pulvinus</b>	a swelling at the base of the stalk of a leaf or leaflet, often glandular or responsive to touch
<b>punctate</b>	marked with dots
<b>pungent</b>	ending in a stiff, sharp point; having an acrid taste or smell
<b>raceme</b>	an indeterminate inflorescence in which a main axis produced a series of flowers on lateral stalks, the oldest at the base and the youngest at the top. adj. <b>racemose</b>
<b>rachis</b>	the axis of an inflorescence or a pinnate leaf; pl. <b>rachises</b> . <b>secondary rachis</b> : the axis of a pinna in a bipinnate leaf
<b>receptacle</b>	the axis of a flower (= <b>torus</b> ); <i>in ferns</i> , an axis on which sporangia arise
<b>recurved</b>	curved or curled downwards or backwards
<b>reflexed</b>	bent sharply downwards or backwards
<b>reticulate</b>	forming a network
<b>retorse</b>	directed backwards or downwards. cf. <b>antrorse</b>
<b>revolute</b>	rolled downwards or backwards
<b>rhizome</b>	a horizontal underground stem
<b>rhomboid</b>	quadrangular, with the lateral angles obtuse
<b>scabrid (= scabrous)</b>	rough to the touch

<b>scale</b>	a reduced or rudimentary leaf
<b>scape</b>	the stem-like, flowering stalk of a plant with radical leaves
<b>scarious</b>	dry and membranous
<b>sclerophyllous</b>	with leaves stiffened by sclerenchyma
<b>sepal</b>	a member of the (usually green) outer whorl of non-fertile parts surrounding the fertile organs of a flower
<b>serrate</b>	toothed, with asymmetrical teeth pointing forward. Fig. 24
<b>sessile</b>	without a stalk (when applied to a stigma, indicates that the style is absent, the stigma being 'sessile' on the ovary)
<b>seta</b>	a bristle or stiff hair
<b>shrub</b>	a woody plant less than 5 metres high, either without a distinct main axis, or with branches persisting on the main axis almost to its base
<b>simple</b>	undivided; <i>of a leaf</i> , not divided into leaflets; <i>of a hair or an inflorescence</i> , not branched
<b>sinuate</b>	with deep, wave-like depressions along the margin. cf. <b>undulate</b>
<b>sinus</b>	a notch or depression in the margin of an organ
<b>solitary</b>	<i>of flowers</i> , borne singly, not grouped in an inflorescence
<b>spathe</b>	a large bract ensheathing an inflorescence
<b>spathulate (= spatulate)</b>	spoon-shaped; broad at the tip and narrowed towards the base
<b>species</b>	a taxon comprising individuals, or populations of individuals, capable of interbreeding to produce fertile offspring; the largest group of individuals between which there are no distinguishable, consistent differences in form or reproductive mechanisms
<b>spike</b>	an unbranched, indeterminate inflorescence in which the flowers are without stalks. adj. <b>spicate</b>
<b>spikelet</b>	a unit of the inflorescence in grasses, sedges and some other monocotyledons, consisting of one to many flowers and associated glumes
<b>spine</b>	a stiff, sharp-pointed structure, formed by modification of a plant organ, e.g. a lateral branch or a stipule
<b>spindle-shaped</b>	broadest near the middle and tapering toward both ends
<b>spinescent</b>	ending in a spine; modified to form a spine
<b>spinose</b>	bearing spines
<b>spiral</b>	<i>of leaves or floral organs</i> , borne at different levels on the axis, in an ascending spiral. cf. <b>cyclic</b>
<b>stamen</b>	the male reproductive organ of a flower, consisting of an anther and a filament
<b>staminode</b>	a modified stamen which is sterile, producing no pollen, often rudimentary

<b>standard</b>	the posterior petal in the flower in Papilionaceae
<b>stellate</b>	star-shaped; consisting of star-shaped cells
<b>stem</b>	the main axis or a branch of the main axial system of a plant, developed from the plumule of the embryo and typically bearing leaves
<b>stigma</b>	the pollen-receptive surface of a carpel or group of fused carpels, usually sticky
<b>stipe</b>	a small stalk
<b>stipule</b>	one of a pair of appendages at the bases of leaves in many dicotyledons
<b>stolon</b>	a prostrate or trailing stem that produces roots at the nodes
<b>striate</b>	striped with parallel longitudinal lines or ridges
<b>style</b>	the usually narrowed portion of the pistil connecting the stigma to the ovary
<b>subshrub</b>	a small shrub
<b>subulate</b>	narrow and tapering gradually to a fine point
<b>subterete</b>	almost terete
<b>sucker</b>	a shoot originating from below ground
<b>sulcate</b>	grooved; furrowed
<b>superior</b>	attached above, as an ovary that is attached above the point of attachment of the other floral whorls
<b>taxon</b>	a group or category, at any level, in a system for classifying plants or animals
<b>tepal</b>	a perianth segment in a flower in which all the perianth segments are similar in appearance
<b>terete</b>	cylindrical or nearly so; circular in cross-section
<b>terminal</b>	at the apex or distal end
<b>tessellate</b>	with a chequered pattern
<b>throat</b>	of a corolla tube, the top, where the tube joins the lobes
<b>tomentum</b>	a covering of dense, matted, woolly hairs. adj. <b>tomentose</b>
<b>tortuous</b>	twisted or bent
<b>torus</b>	see <b>receptacle</b>
<b>trifoliolate</b>	having three leaves
<b>trigonous</b>	three-angled
<b>triquetrous</b>	three-edged; with three protruding angles
<b>truncate</b>	with an abruptly transverse end, as if cut off



<b>tuber</b>	a storage organ formed by swelling of an underground stem or the distal end of a root
<b>tubercle</b>	a small wart-like outgrowth
<b>tuberculate</b>	covered with tubercles
<b>tuberous</b>	swollen; of roots, tuber-like
<b>turgid</b>	swollen; expanded or inflated
<b>umbel</b>	a racemose inflorescence in which all the individual flower stalks arise in a cluster at the top of the peduncle and are of about equal length
<b>undulate</b>	wavy, i.e. not flat. cf. <b>sinuate</b>
<b>unisexual</b>	bearing only male or only female reproductive organs
<b>united</b>	fused together
<b>urceolate</b>	urn-shaped
<b>valve</b>	one of the segments of a dehiscent fruit, separating from other such segments at maturity
<b>vein</b>	a strand of vascular tissue
<b>venation</b>	the arrangement of veins in a leaf
<b>verticillate</b>	arranged in one or more whorls
<b>vesicle</b>	a bladder-like sac or cavity filled with gas or liquid
<b>vestigial</b>	reduced from the ancestral condition and no longer functional. cf. <b>rudimentary</b>
<b>villous</b>	shaggy with long, weak hairs
<b>viscid</b>	of a surface, sticky; coated with a thick, syrupy secretion
<b>whorl</b>	a ring of leaves, bracts or floral parts borne at the same level on an axis
<b>wing</b>	a membranous expansion of a fruit or seed, which aids dispersal; a thin flange of tissue extended beyond the normal outline of a stem or petiole; a lateral petal of a flower in Papilionaceae

## References

Harris and Harris (1994), McCusker (1981).